

BULLETIN 248B

**TECHNICAL MANUAL
MODEL 28
TAPE HANDLING STAND (LTHS)
AND
REPERFORATOR TRANSMITTER
BASE (LRXB)**



**TELETYPE[®]
CORPORATION**

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INTRODUCTION

Bulletin 248B provides adjustments, lubrication, disassembly and reassembly procedures for the Model 28 Tape Handling Stand (LTHS) and Reperforator Transmitter Base (LRXB).

The bulletin is made up of a group of appropriate, independent sections. They are separately identified by title and section number, and the pages of each section are numbered consecutively, independent of other sections.

The identifying number of a section, a 9-digit number, appears at the top of each page of the section, in the left corner of left-hand pages and right corner of right-hand pages. The sections are placed in the manual in ascending numerical order.

To locate specific information refer to the table of contents on the following page. Find the name of the involved component in column one and the title of section in column two. The correct 9-digit section number will then be found in column three. Turn to page one of the section indicated where the contents of that section will be found (except where a section is small and does not require a listing of contents).

Note: Individual copies of the sections in this bulletin are available upon request.

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Note: For information on Motor Units see Bulletin 295B.

28 TAPE HANDLING STAND (LTHS) AND
REPERFORATOR TRANSMITTER BASE (LRXB)

ADJUSTMENTS

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1. GENERAL

1.01 This section presents adjustment information for the Teletype Model 28 tape handling stands and reperforator transmitter bases.

1.02 The reperforator transmitter bases covered in this section are used on three different Reperforator Transmitter Sets. These are:

- (a) A Standard Speed Reperforator Transmitter Set capable of sending and receiving data at standard line speeds of 60, 75, or 100 words per minute.
- (b) A Low to High Speed Reperforator Transmitter Set for receiving data at standard line speeds of 60, 75, or 100 words per minute and transmitting at speeds of up to and including approximately 1000 words per minute.
- (c) A High to Low Speed Reperforator Transmitter Set for receiving data at speeds of up to and including approximately 1000 words per minute and transmitting at standard line speeds of 60, 75, and 100 words per minute.

1.03 The standard speed tape handling stand is capable of winding tape at a speed of 200 words per minute and is used in conjunction with the Standard Speed Reperforator Transmitter Set. The high speed tape handling stand is capable of winding tape at a speed of 1000 words per minute and is used on both the Low to High and High to Low Reperforator Transmitter Sets.

Note: Remove power from unit before making any adjustments.

1.04 It is assumed that the mechanisms illustrated in this section are being viewed from a position in front of the equipment, unless the illustrations are specifically labeled otherwise. In the line drawings, fixed pivot points are shown by solid black circles and moveable points are shown by cross-hatched circles. References in the text to left, right, up, down, front, or rear apply to the unit in its normal operating position with the viewer facing the tape storage bin.

1.05 In the adjustments and spring tensions covered in this section, location of clearances, position of parts, and point and angle of scale applications are illustrated by drawings. Requirements and procedures are set forth in the texts that accompany the drawings. A complete adjusting procedure should be read before making the adjustment or checking the spring tension. The adjustments are arranged in a sequence that should be followed if a complete readjustment of the unit were undertaken.

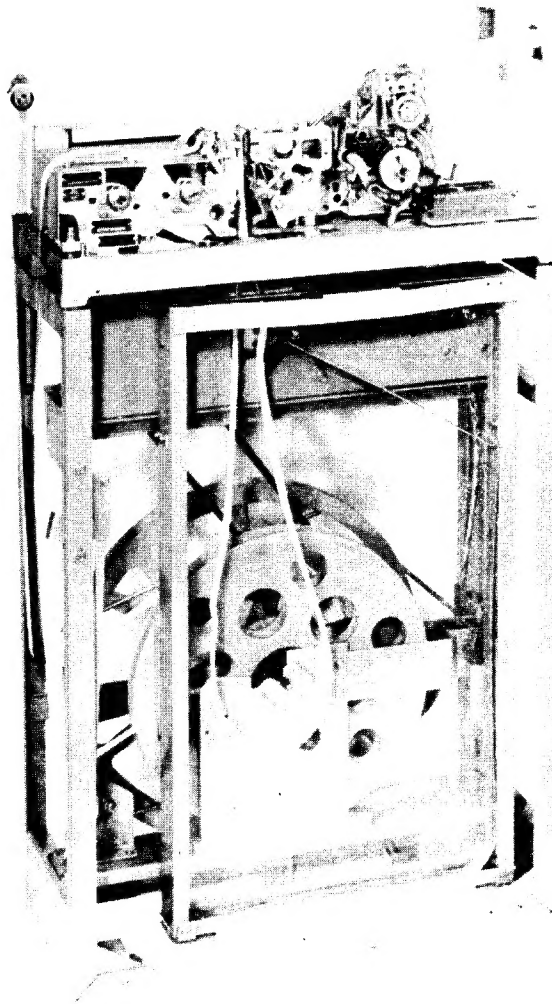
SECTION 573-104-700TC

1.06 Tools required to make the adjustments and check the spring tensions are not supplied with the equipment, but are listed in Section 570-005-800TC.

1.07 When a part mounted on shims is removed, the number of shims at each mounting screw should be noted so that the identical shim pile-up can be made when the part is remounted. Unless stated otherwise, all nuts and screws that were loosened should be tightened after an adjustment has been made.

1.08 The spring tensions given in this section are indicated values and should be checked with Teletype scales in the positions shown in the drawings. Springs which do not meet the requirements, and for which there are no adjusting procedures, should be discarded and replaced by new springs.

1.09 When rotating the drive shaft gear by hand, the rotation is counterclockwise as viewed from the exposed side of the drive shaft gear.

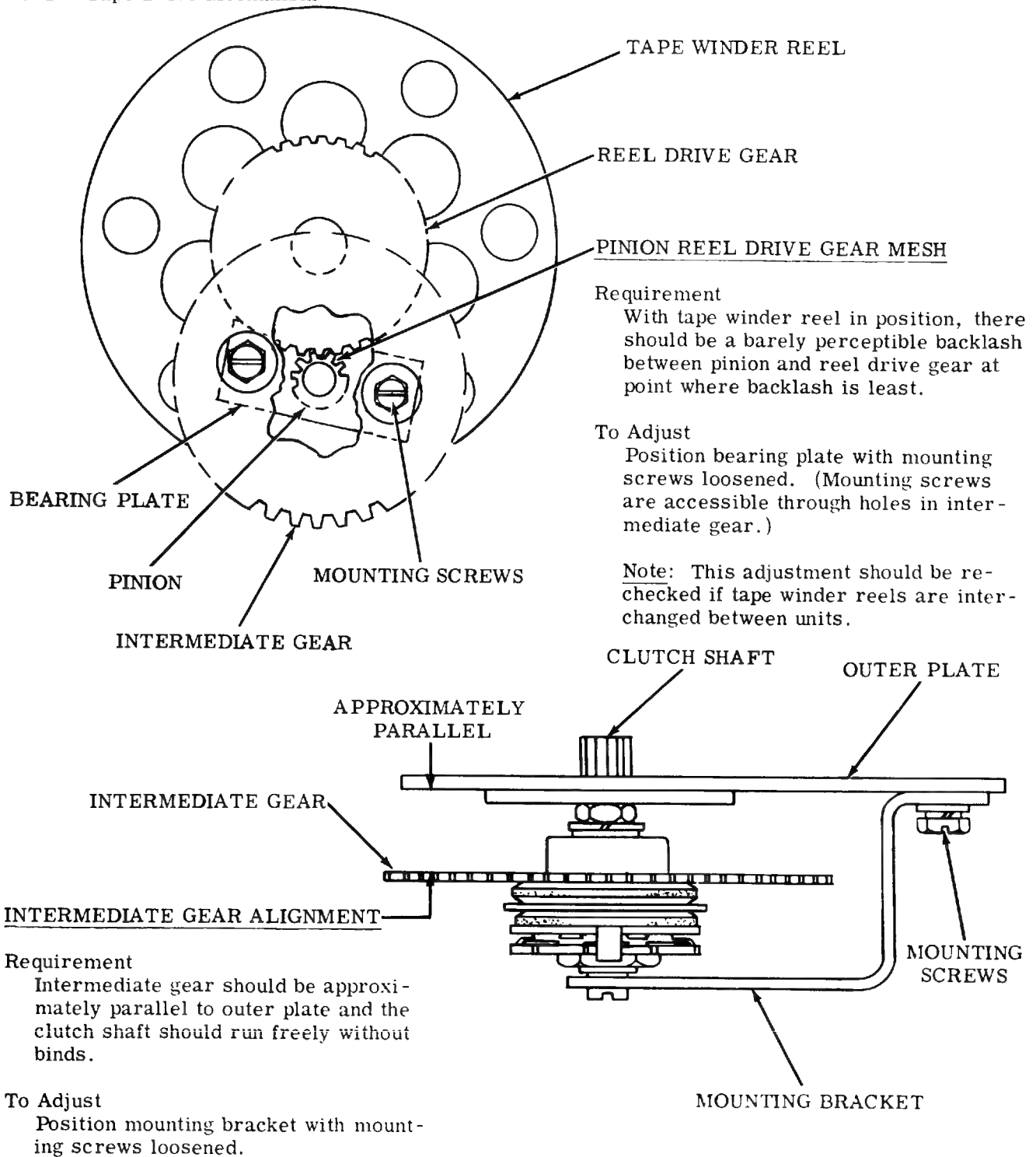


Model 28 Reperforator Transmitter Set

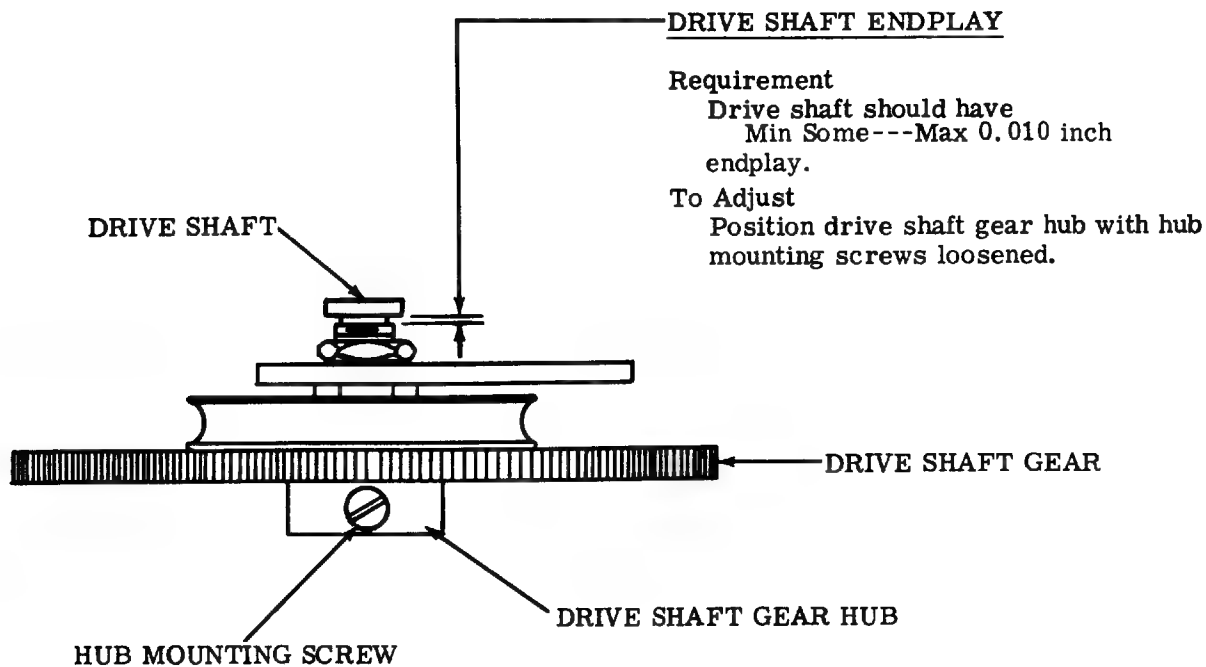
2. ADJUSTMENTS

STANDARD SPEED TAPE HANDLING STAND

2.01 Tape Drive Mechanism



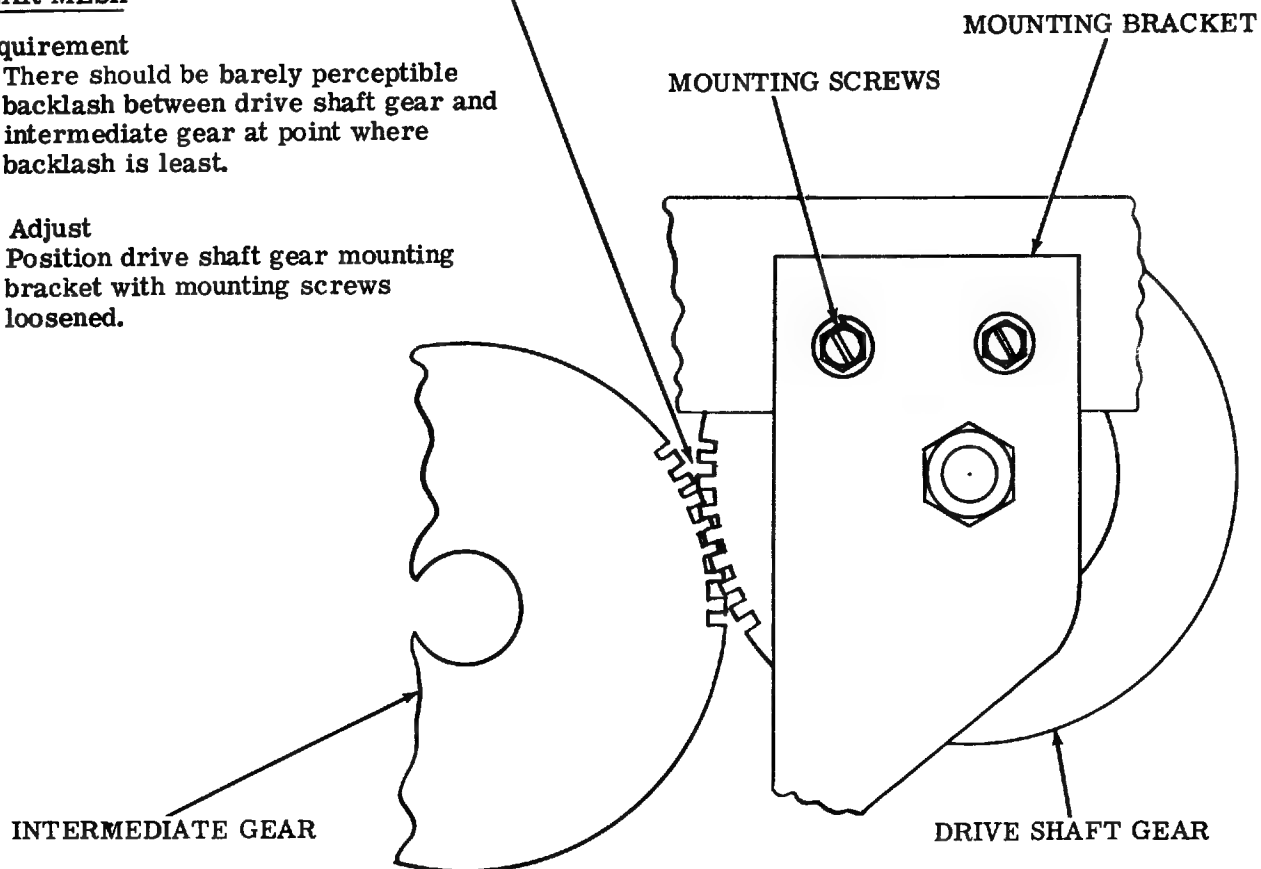
2.02 Tape Drive Mechanism (continued)



DRIVE SHAFT GEAR - INTERMEDIATE
GEAR MESH

Requirement
There should be barely perceptible
backlash between drive shaft gear and
intermediate gear at point where
backlash is least.

To Adjust
Position drive shaft gear mounting
bracket with mounting screws
loosened.



2.03 Tape Control Mechanism

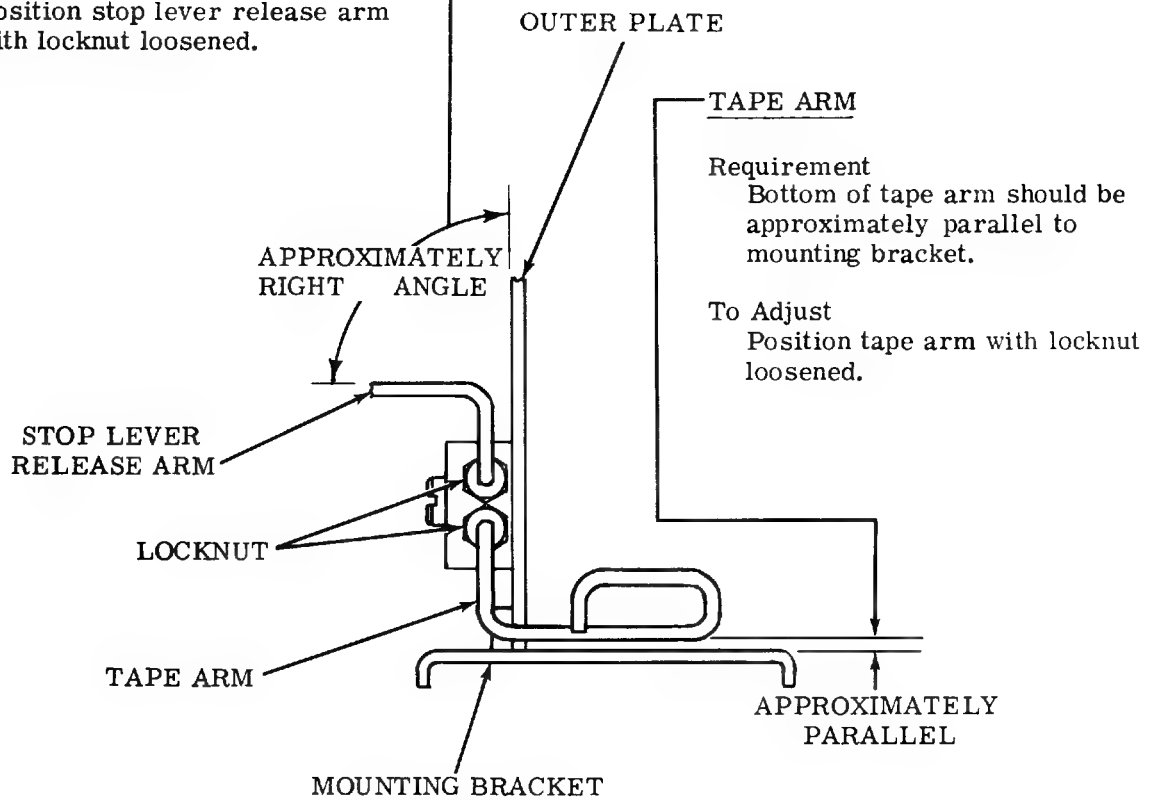
STOP LEVER RELEASE ARM

Requirement

Stop lever release arm should be approximately at right angle to outer plate.

To Adjust

Position stop lever release arm with locknut loosened.



2.04 Tape Control Mechanism (continued)

STOP LEVER ECCENTRIC STUD

Requirement

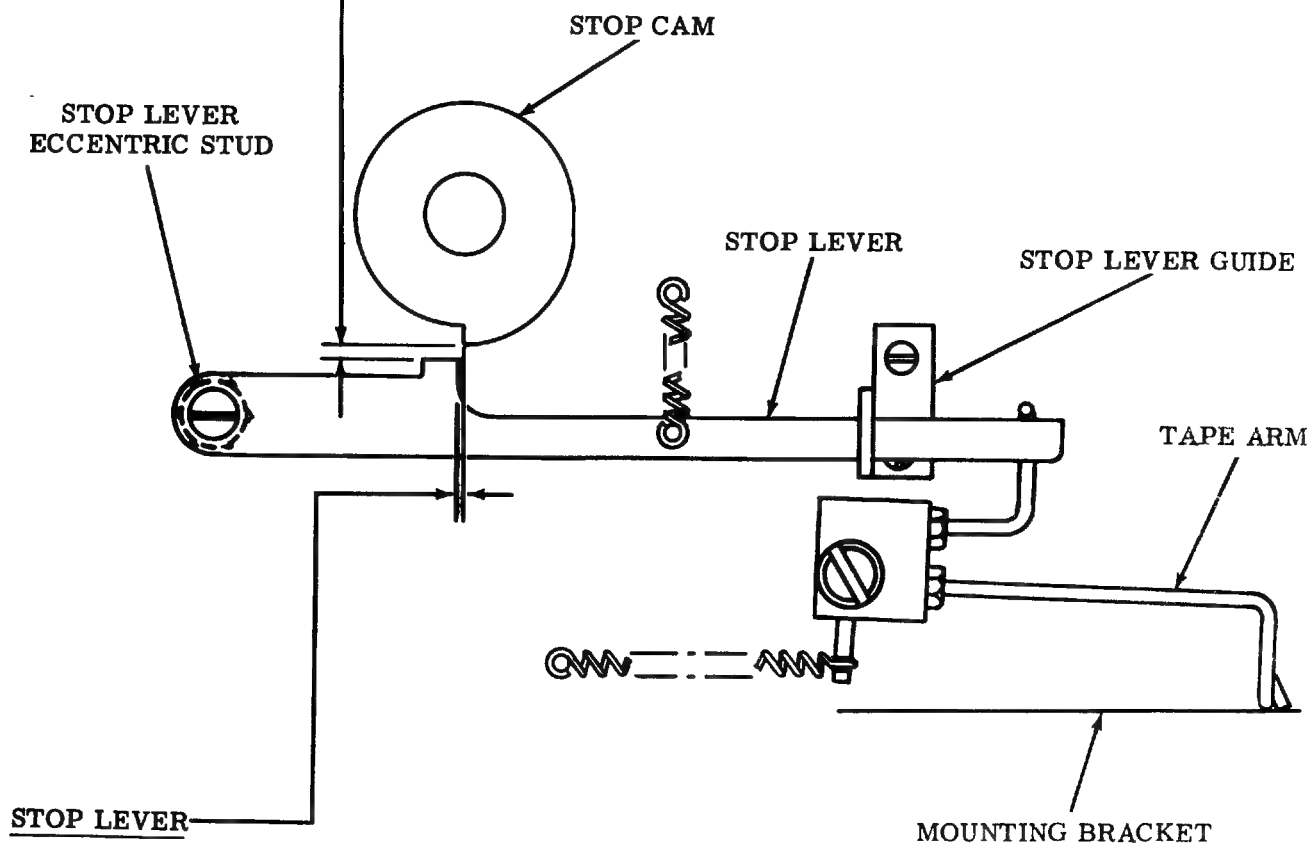
Tape arm resting against mounting bracket. Clearance between high part of stop cam and top of stop lever projecting ear should be
Min 0.005 inch---Max 0.015 inch

To Adjust

Position stop lever eccentric stud (high part toward rear of unit) with its locknut loosened.

Note 1: Check that there is some clearance between bottom of slot in stop lever guide and stop lever. If necessary, lower stop lever guide with mounting screws loosened.

Note 2: If the 0.005 inch to 0.015 inch clearance cannot be met refine stop lever release arm adjustment above.



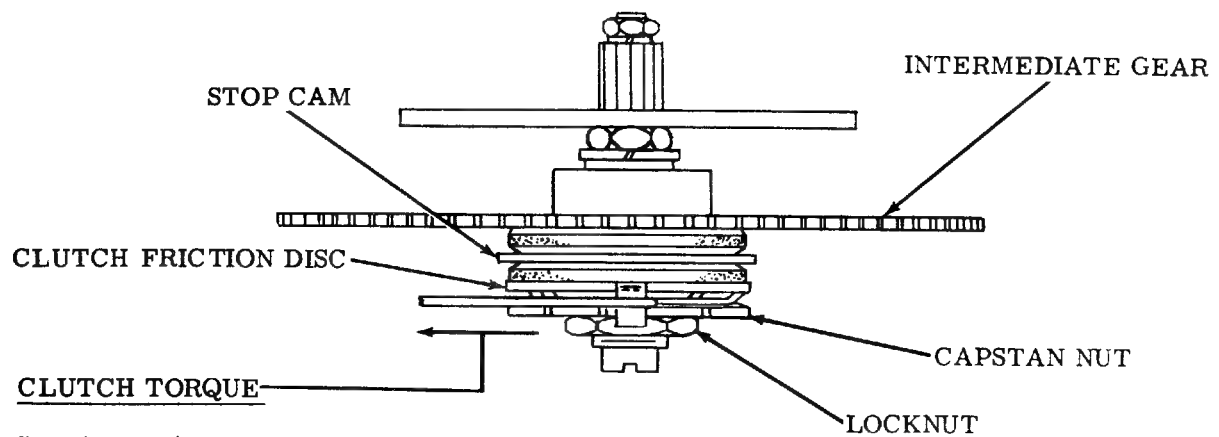
Requirement

Face of stop can should be parallel to mating surface of stop levers projecting ear when stop lever is in engagement with stop cam.

To Adjust

Position post with stop lever mounting post nut loosened. High part of eccentric post must be toward rear of unit. Tighten nut.

2.05 Tape Drive Mechanism (continued)

**Requirement**

Power applied to unit. Stop lever held out of engagement with stop cam.

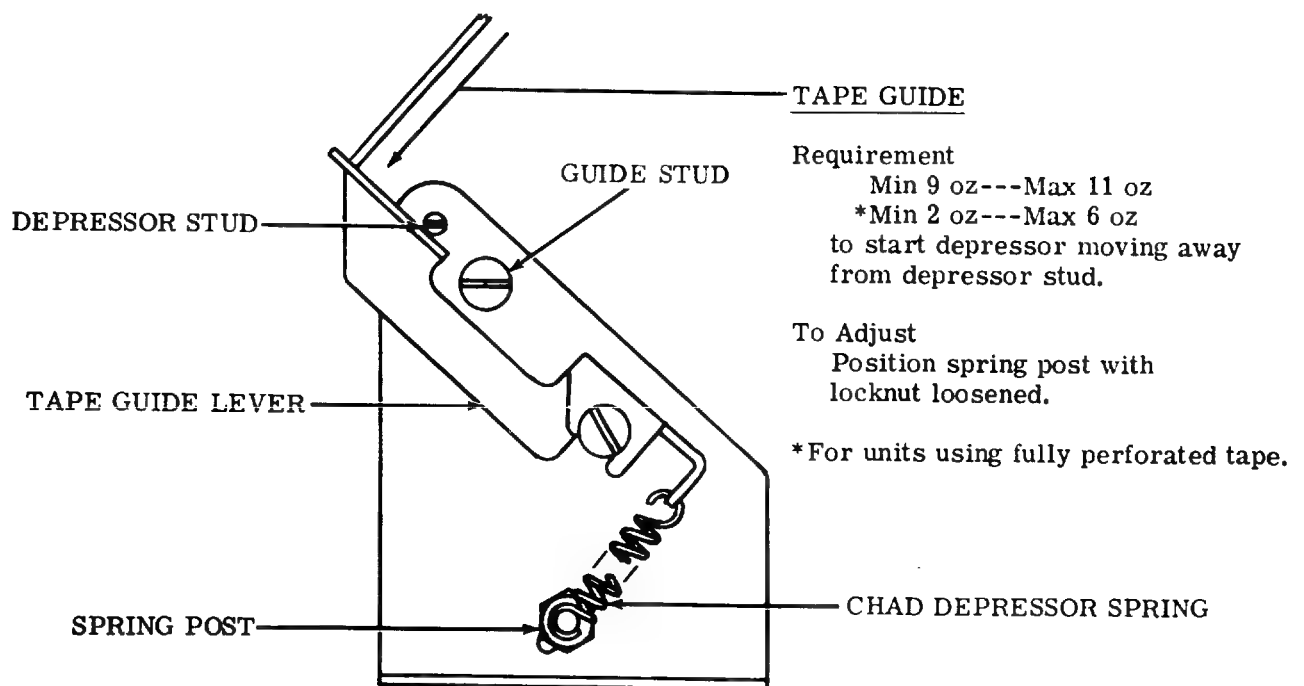
Min 12 oz---Max 16 oz
to keep clutch friction disc from moving.

To Adjust

Position capstan nut with locknut loosened; clockwise to increase tension, counterclockwise to decrease tension.

Note: This measurement should be made when unit is warm from operation.

2.06 Tape Control Mechanism (continued)

**Requirement**

Min 9 oz---Max 11 oz

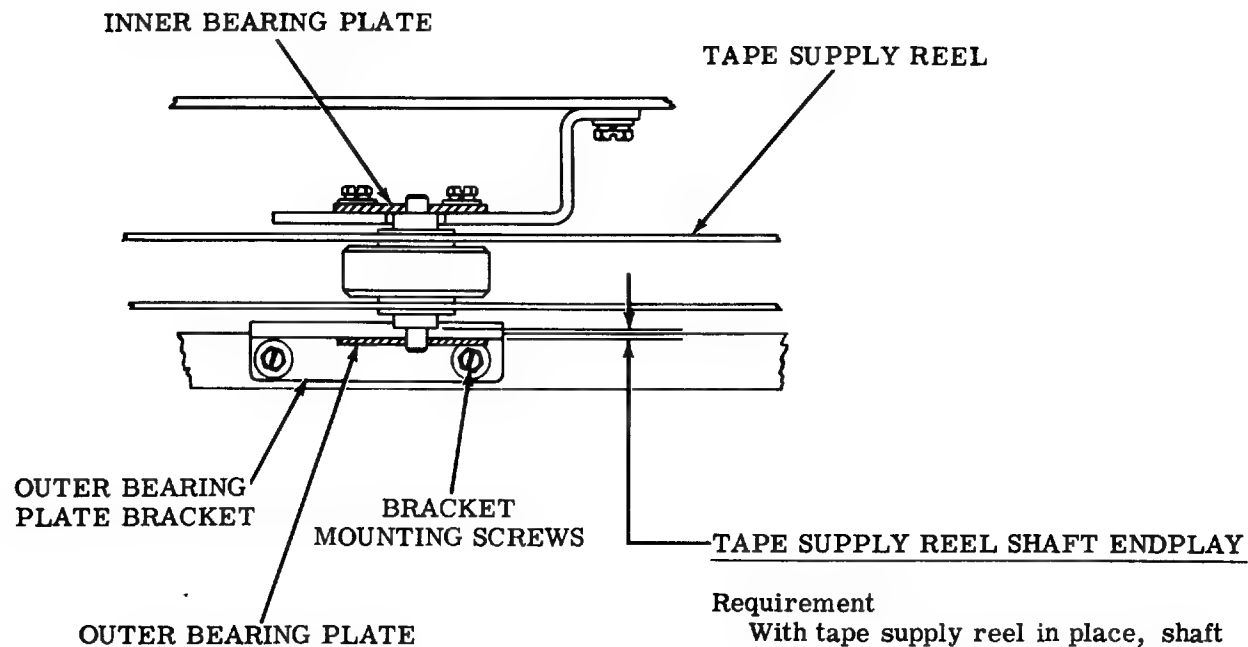
*Min 2 oz---Max 6 oz
to start depressor moving away from depressor stud.

To Adjust

Position spring post with locknut loosened.

*For units using fully perforated tape.

2.07 Tape Reel Mechanism



Requirement

With tape supply reel in place, shaft endplay should be

Min Some---Max 0.100 inch

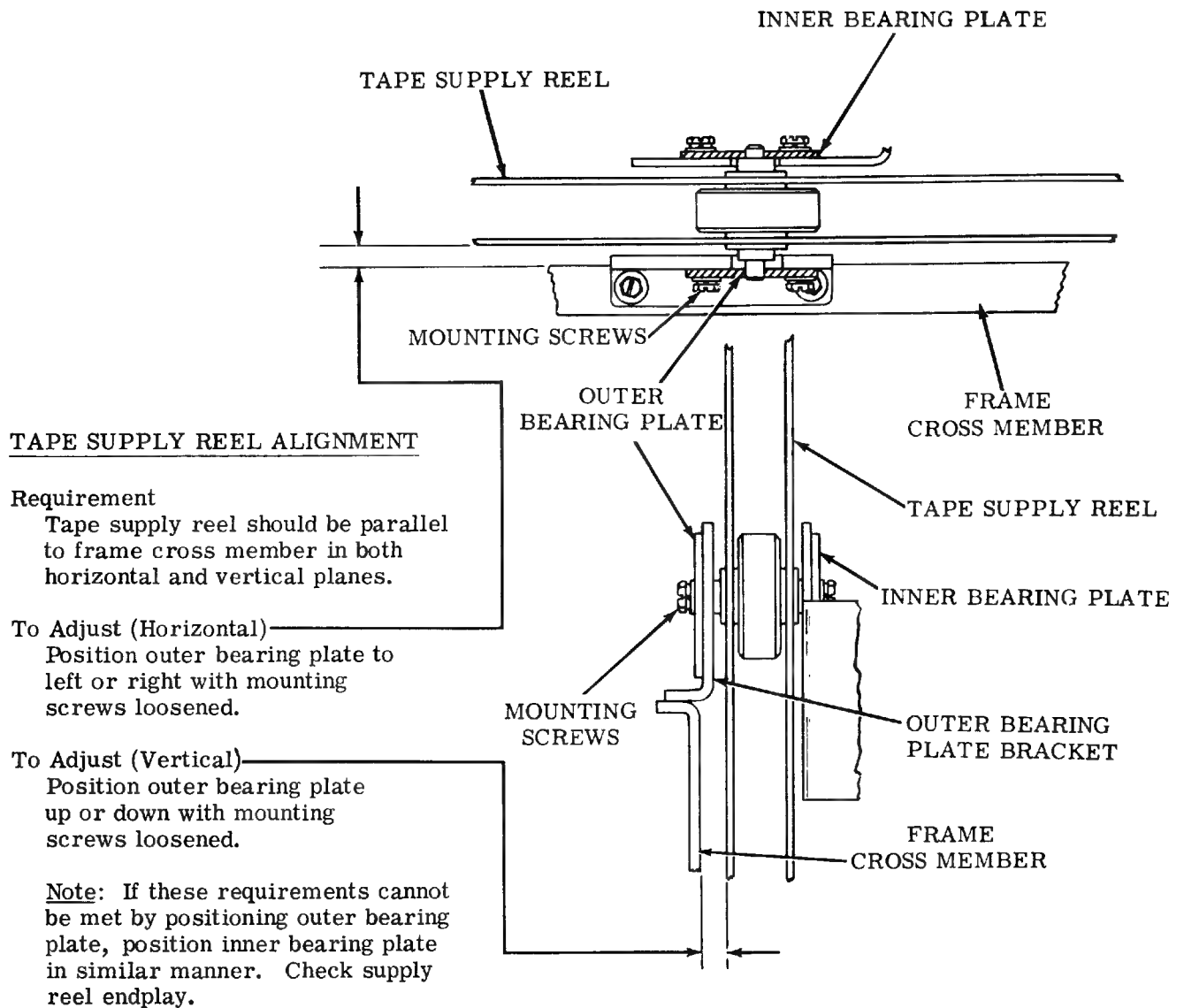
*Min Some---Max 0.062 inch

To Adjust

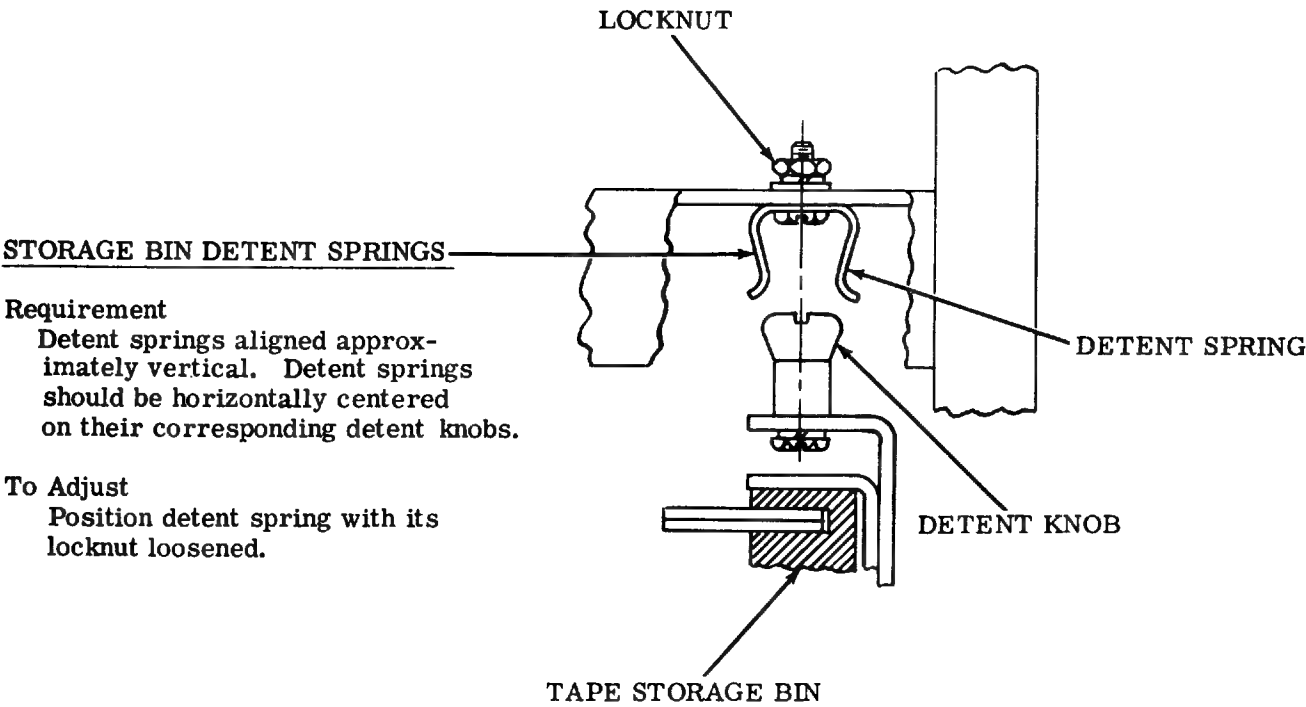
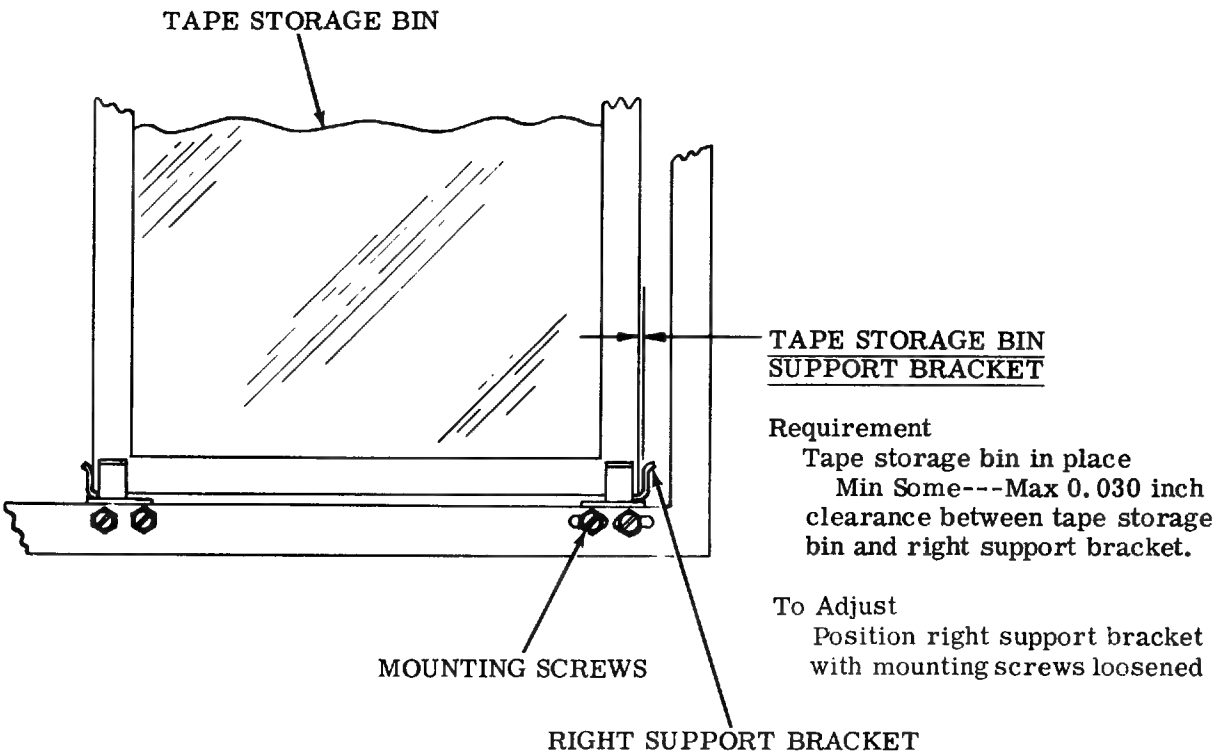
Position outer bearing plate bracket with mounting screws loosened.

*Units with V belt drive.

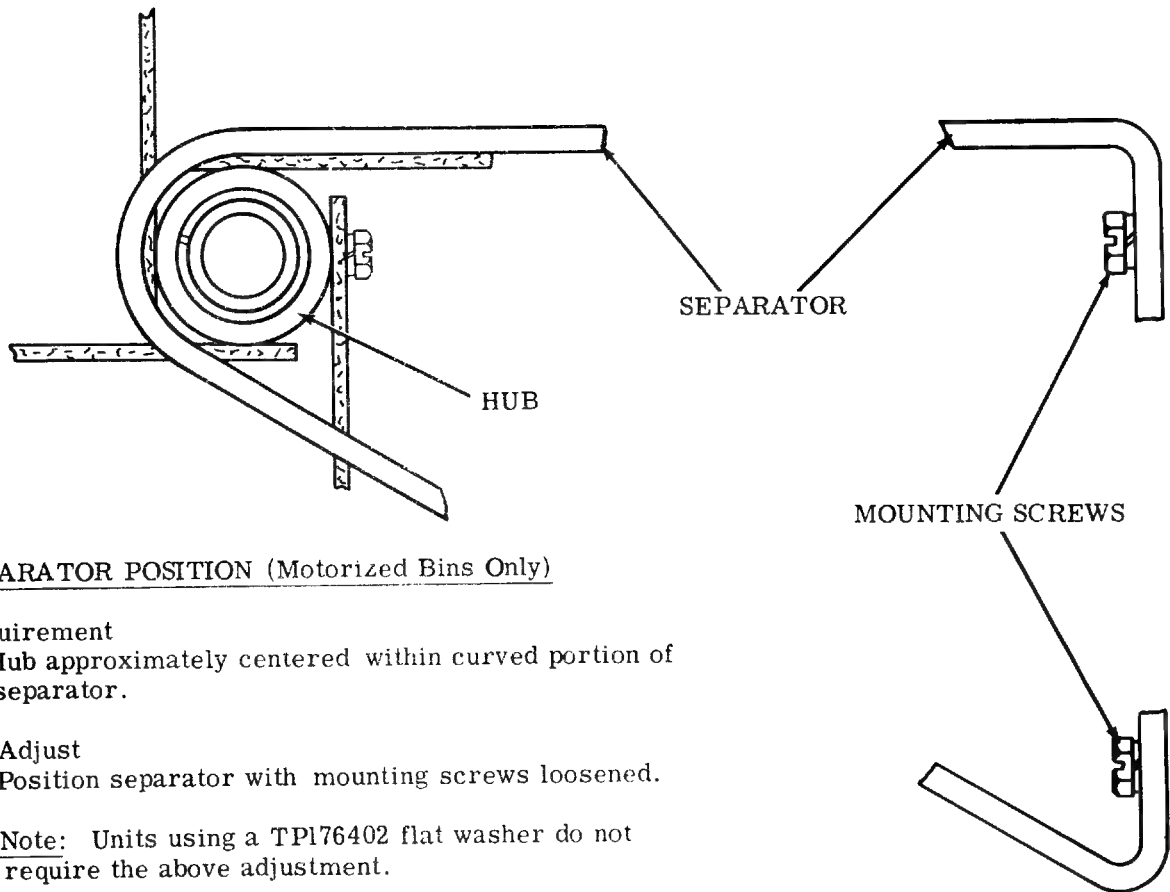
2.08 Tape Reel Mechanism (continued)



2.09 Tape Bin



2.10 Tape Control Mechanism (continued)

SEPARATOR POSITION (Motorized Bins Only)**Requirement**

Hub approximately centered within curved portion of separator.

To Adjust

Position separator with mounting screws loosened.

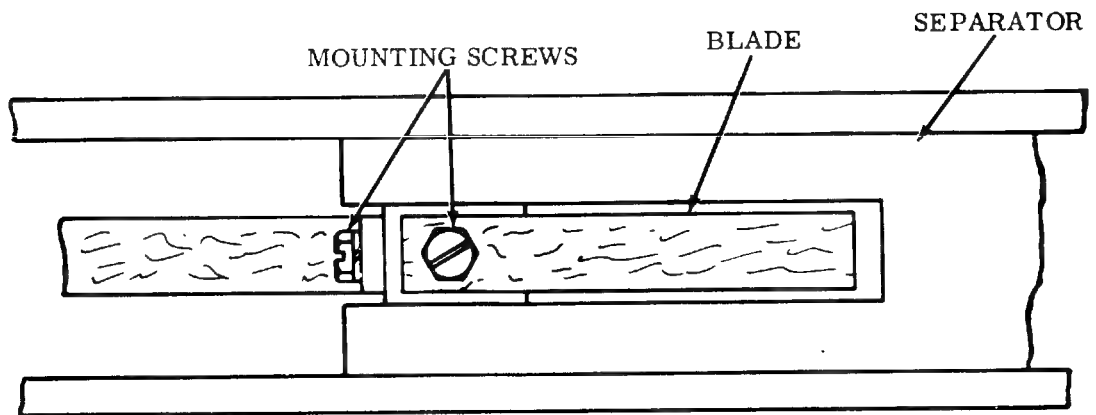
Note: Units using a TP176402 flat washer do not require the above adjustment.

BLADE POSITION (Motorized Bins Only)**Requirement**

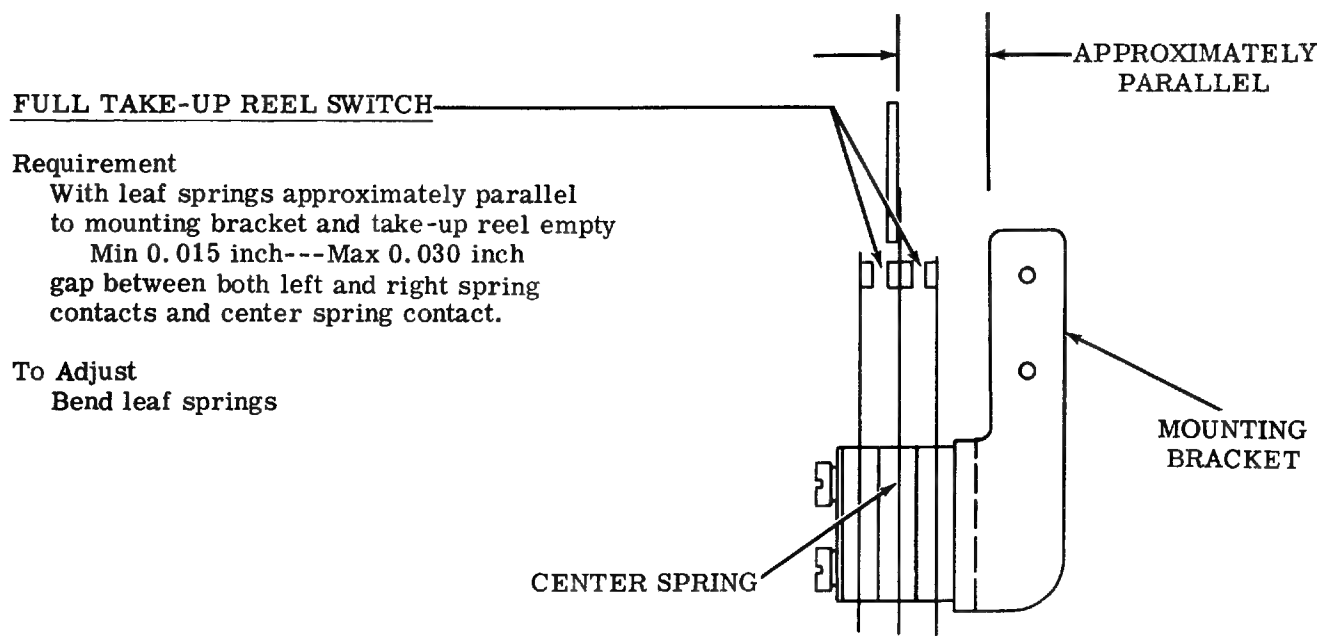
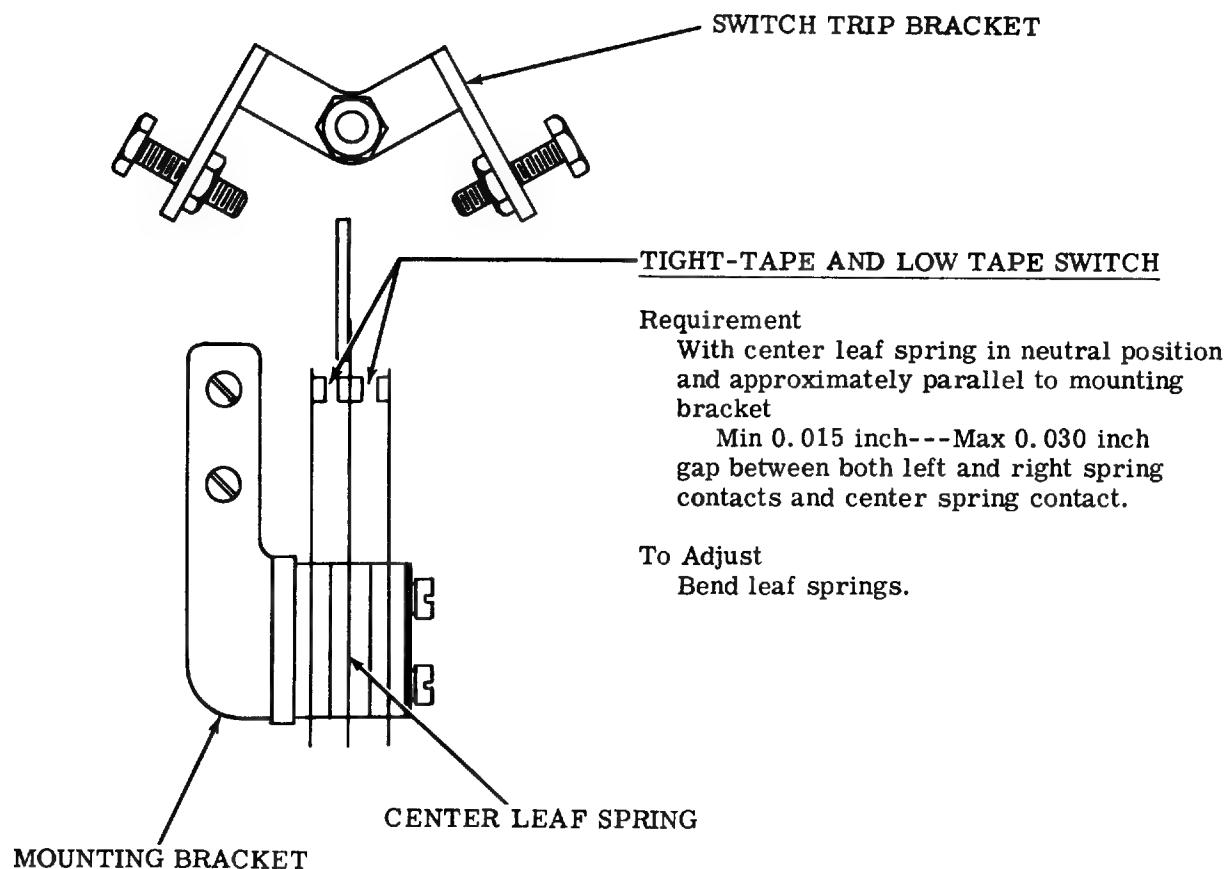
Blades should be approximately centered in slot in separator. Check four blades.

To Adjust

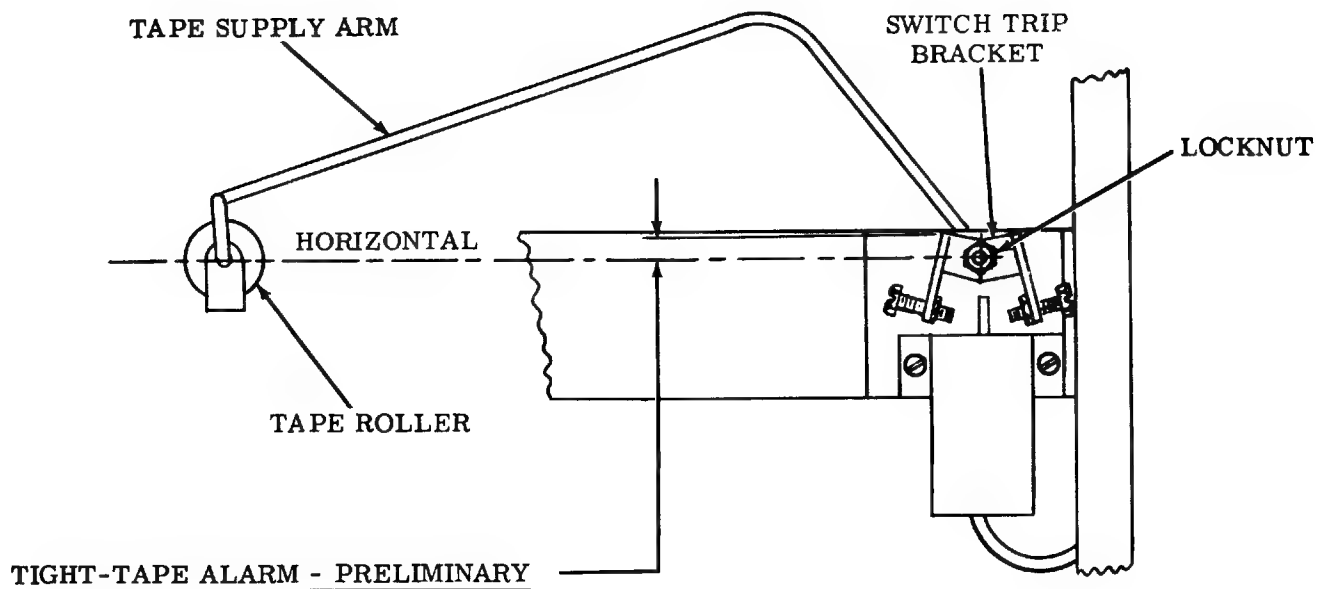
Position blades with mounting screws loosened.



2.11 Tape Control Mechanism (continued)



2.12 Tape Control Mechanism (continued)

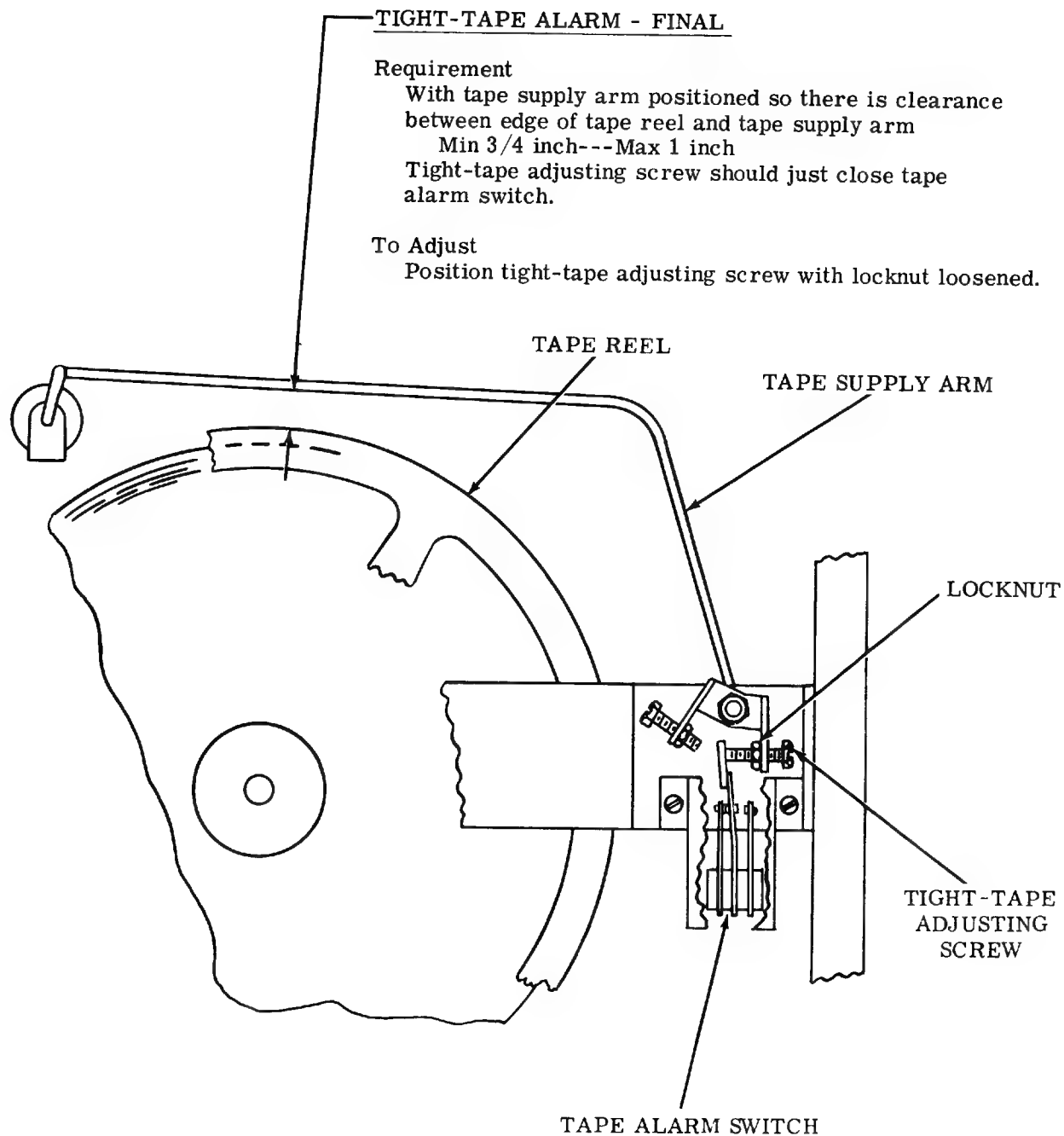
**Requirement**

With tape supply arm positioned so tape roller and trip bracket locknut are on same horizontal level, top of switch trip bracket should be approximately horizontal.

To Adjust

Position switch trip bracket with locknut loosened.

2.13 Tape Control Mechanism (continued)



2.14 Tape Control Mechanism (continued)

LOW TAPE ALARM

Requirement

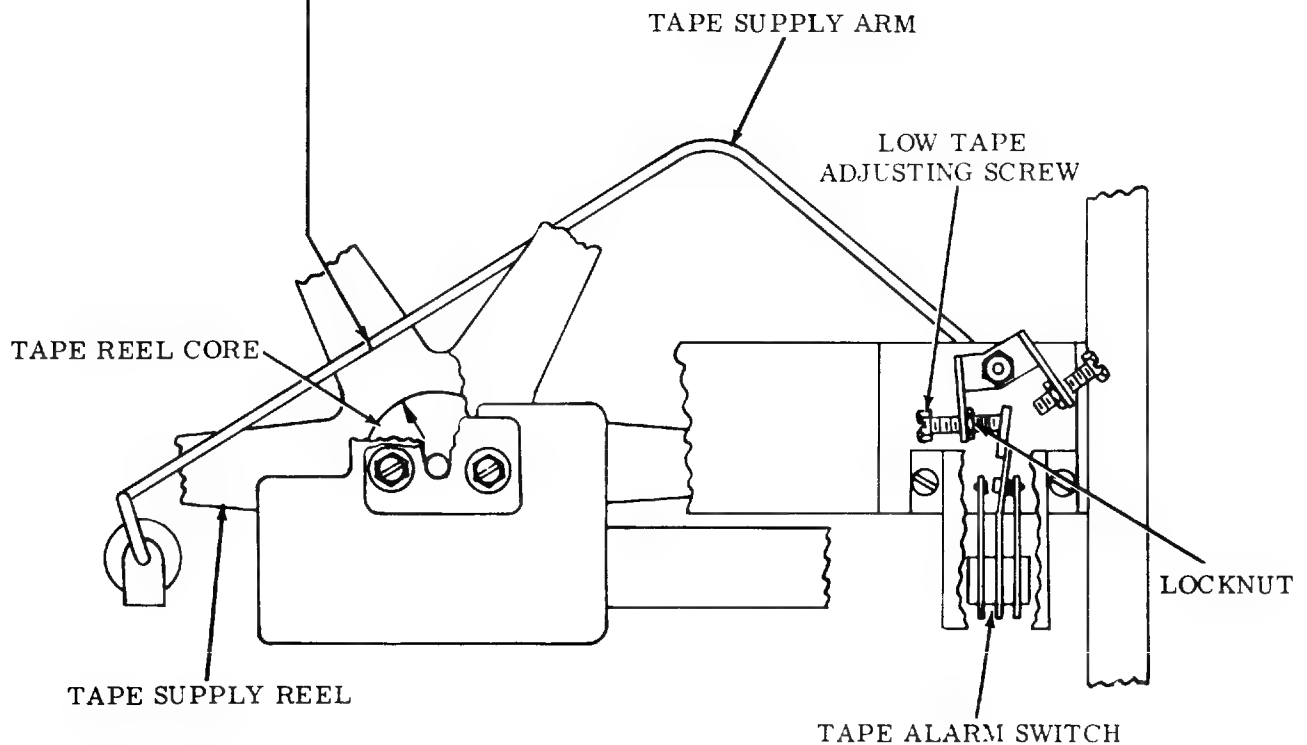
With tape supply arm positioned so there is clearance between empty tape reel core and tape supply arm

Min 1/2 inch---Max 3/4 inch

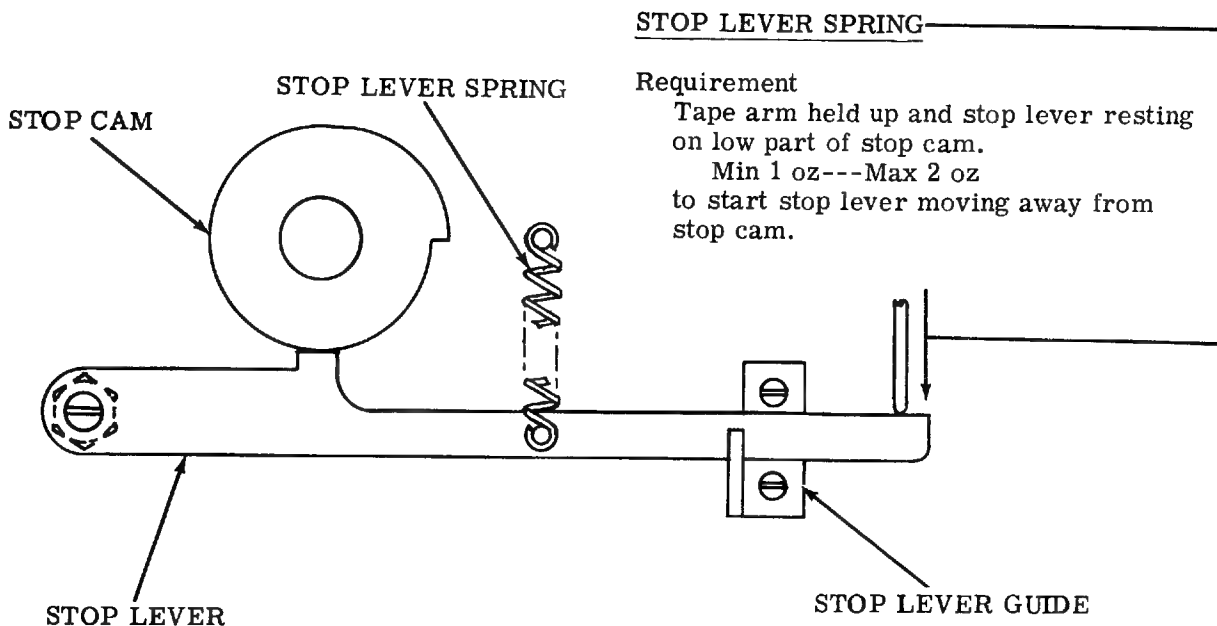
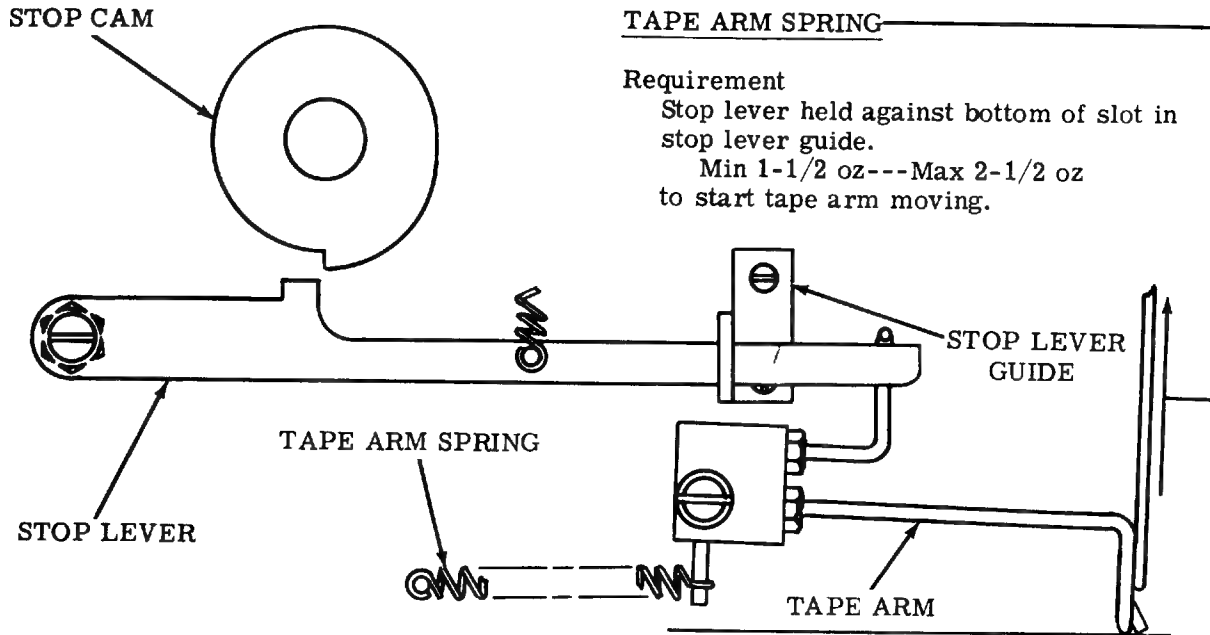
Low tape adjusting screw should just close tape alarm switch.

To Adjust

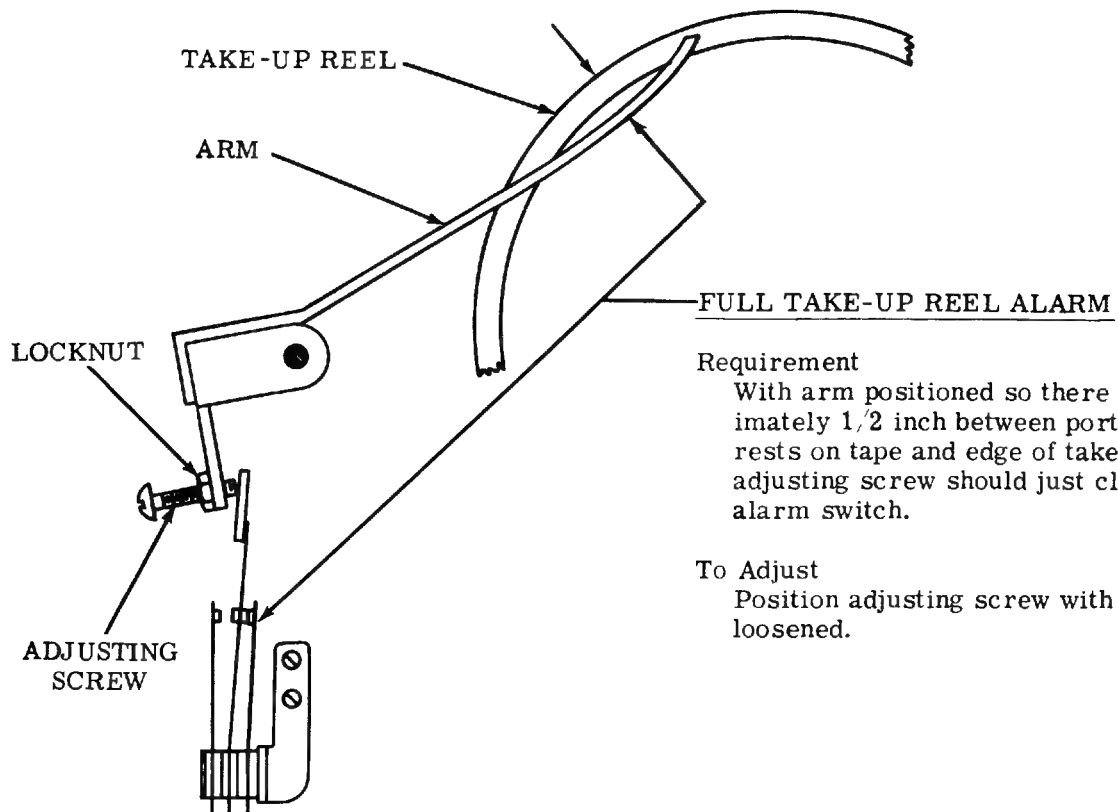
Position low tape adjusting screw with locknut loosened.



2.15 Tape Control Mechanism (continued)



2.16 Tape Control Mechanism (continued)

ACTUATOR SPRING**Requirement**

With actuator spring hooked in first hole

Min 2-1/4 oz --- Max 2-1/2 oz to separate actuator extension from leaf spring operating button. If requirement cannot be met replace spring.

TAPE BIN FULL SWITCH**Requirement**

With leaf spring approximately parallel to mounting bracket and actuator extension held away from operating button

Min 3/4 oz --- Max 1-1/4 oz

*Min 1 oz --- Max 1-1/2 oz to open contacts.

To Adjust
Bend leaf springs.

*For units using fully perforated tape.

ACTUATOR
EXTENSION

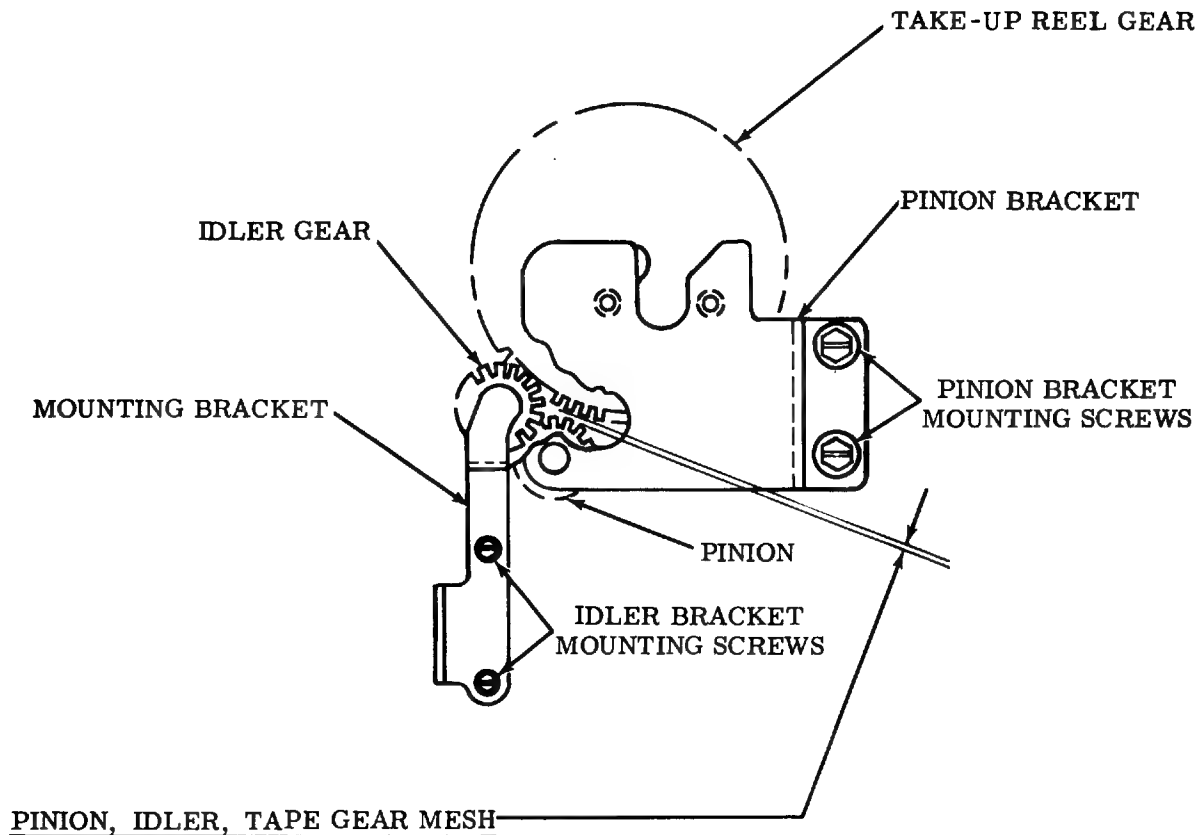
LEAF SPRING CONTACTS

ACTUATOR

MOUNTING BRACKET

2.17 Tape Drive Mechanism (continued)

Note: This adjustment is used when replacing the felt clutch on the low speed tape handling stand with a belt drive mechanism.

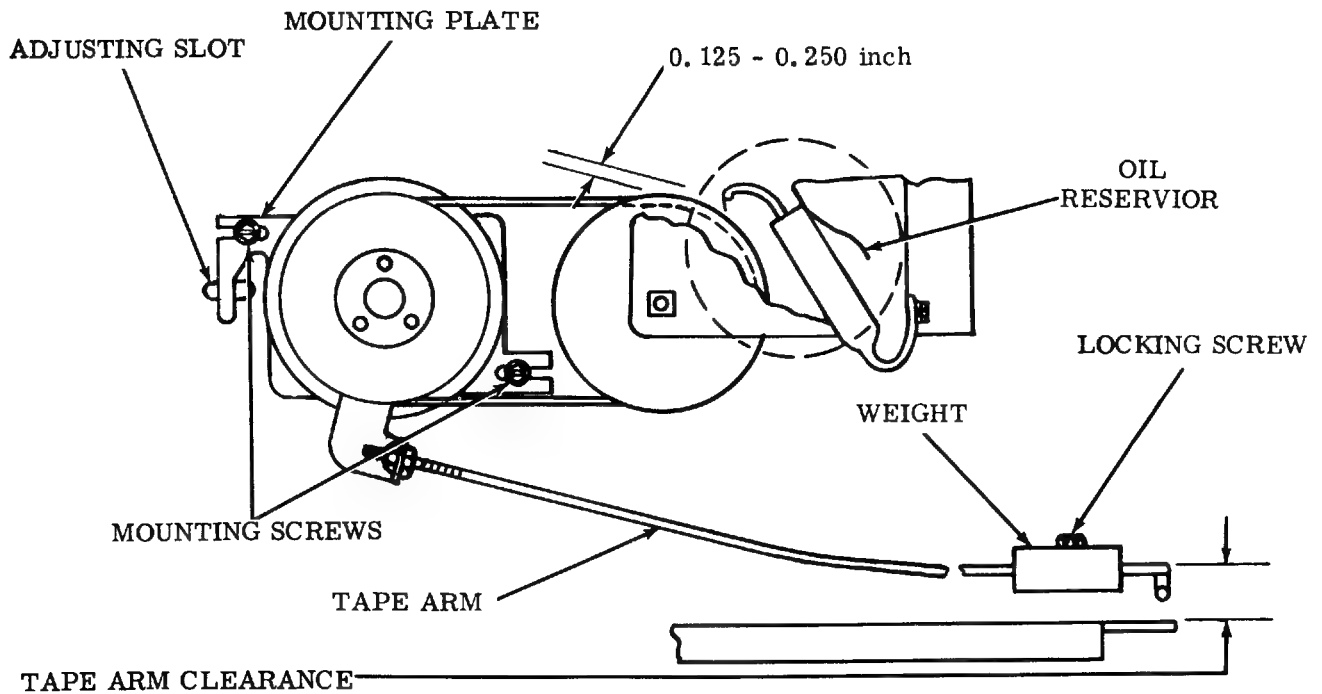


- (1) Requirement
With take-up reel in position there should be a barely perceptible amount of backlash between take-up reel gear and idler gear and between idler gear and pinion at point where backlash is least.
- (2) Requirement
Clearance between outside diameters of take-up reel gear and pinion at closest point on their peripheries
Min 0.015 inch.

To Adjust
With pinion bracket and idler bracket mounting screws loosened, position both brackets to meet requirements.

2.18 Tape Control Mechanism (continued)

Note: These two adjustments are used when replacing the felt clutch on the low speed tape handling stand with a belt drive mechanism.

**Requirement**

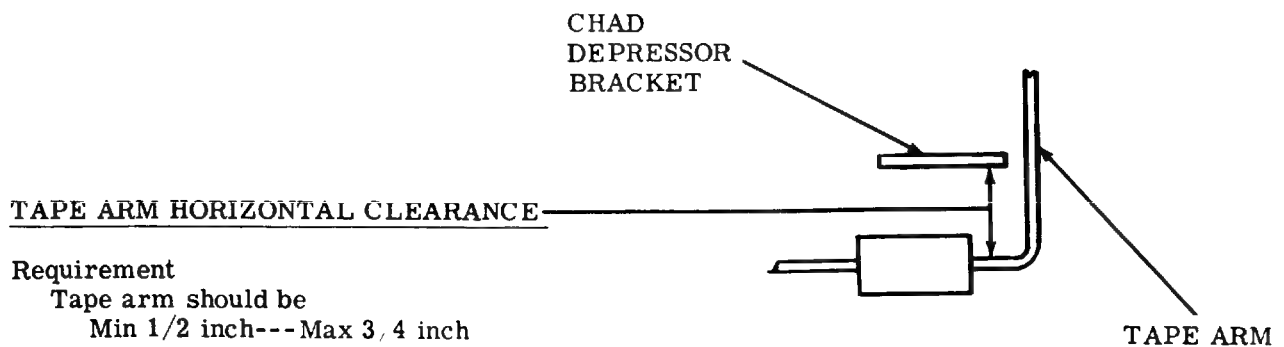
With take-up reel removed

Min 3/4 inch---Max 1 inch

from top edge of tape arm to top of mounting bracket.

To Adjust

Loosen mounting screws. Insert screwdriver in adjusting slot and position mounting plate so top of tape arm is approximately 1-1/4 inches above bar. Tighten mounting screws. Push tape arm down until it touches mounting bracket and let it rise slowly. Arm should come to rest as per requirement. If necessary, refine adjustment.

**Requirement**

Tape arm should be

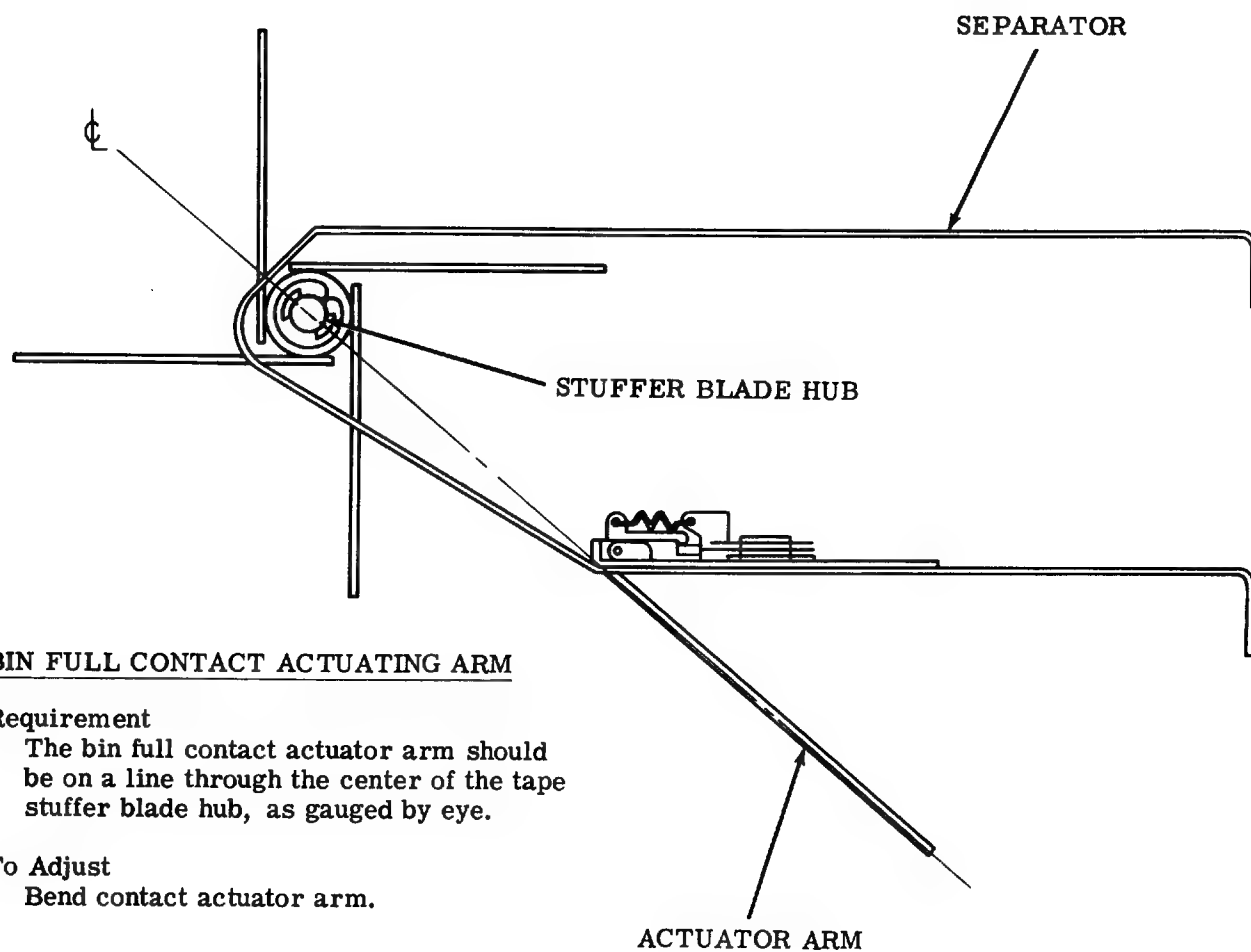
Min 1/2 inch---Max 3, 4 inch

from chad depressor bracket.

To Adjust

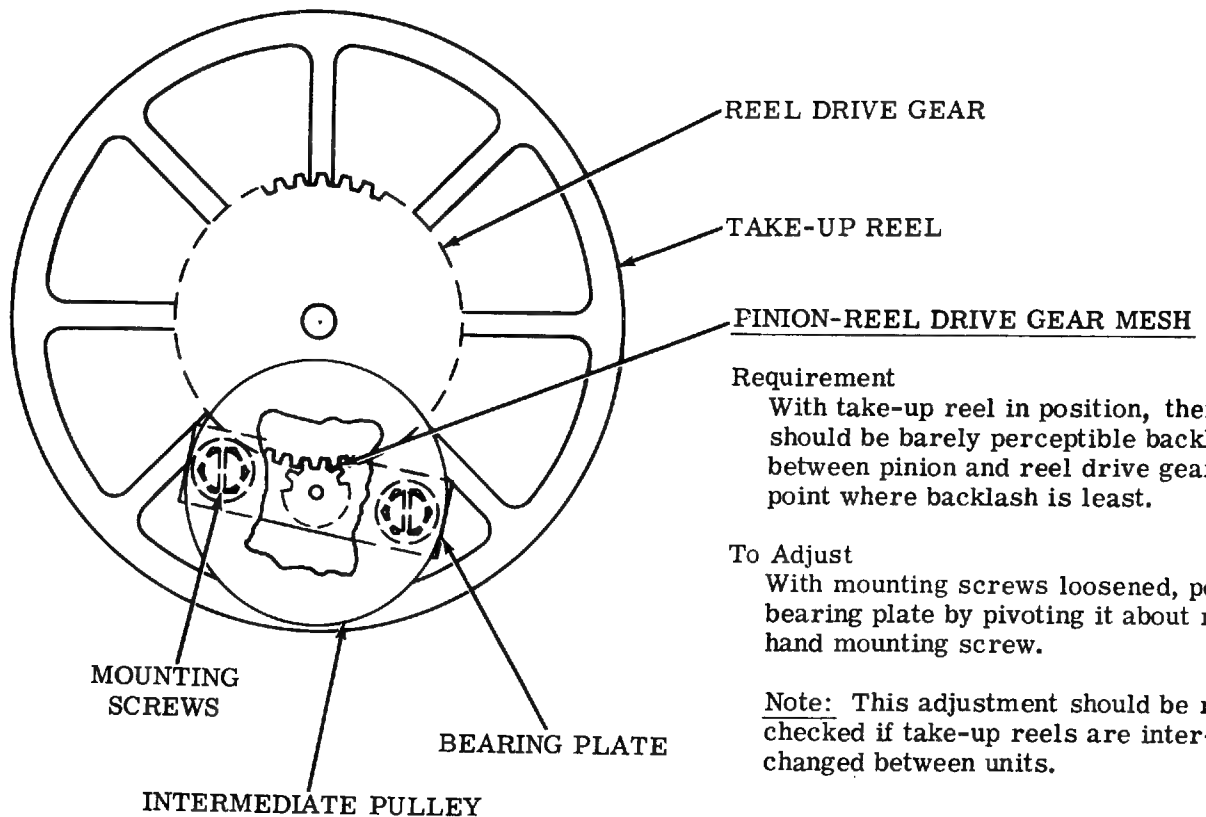
Bend arm to meet requirement.

2.19 Tape Control Mechanism (continued)



HIGH SPEED TAPE HANDLING STAND (FLAT BELT WINDER)

2. 20 Tape Drive Mechanism

INTERMEDIATE PULLEY ALIGNMENT

Requirement

Intermediate pulley should be approximately parallel to outer plate and clutch shaft should run free without binds.

To Adjust

Position mounting bracket with mounting screws loosened.

INTERMEDIATE PULLEY

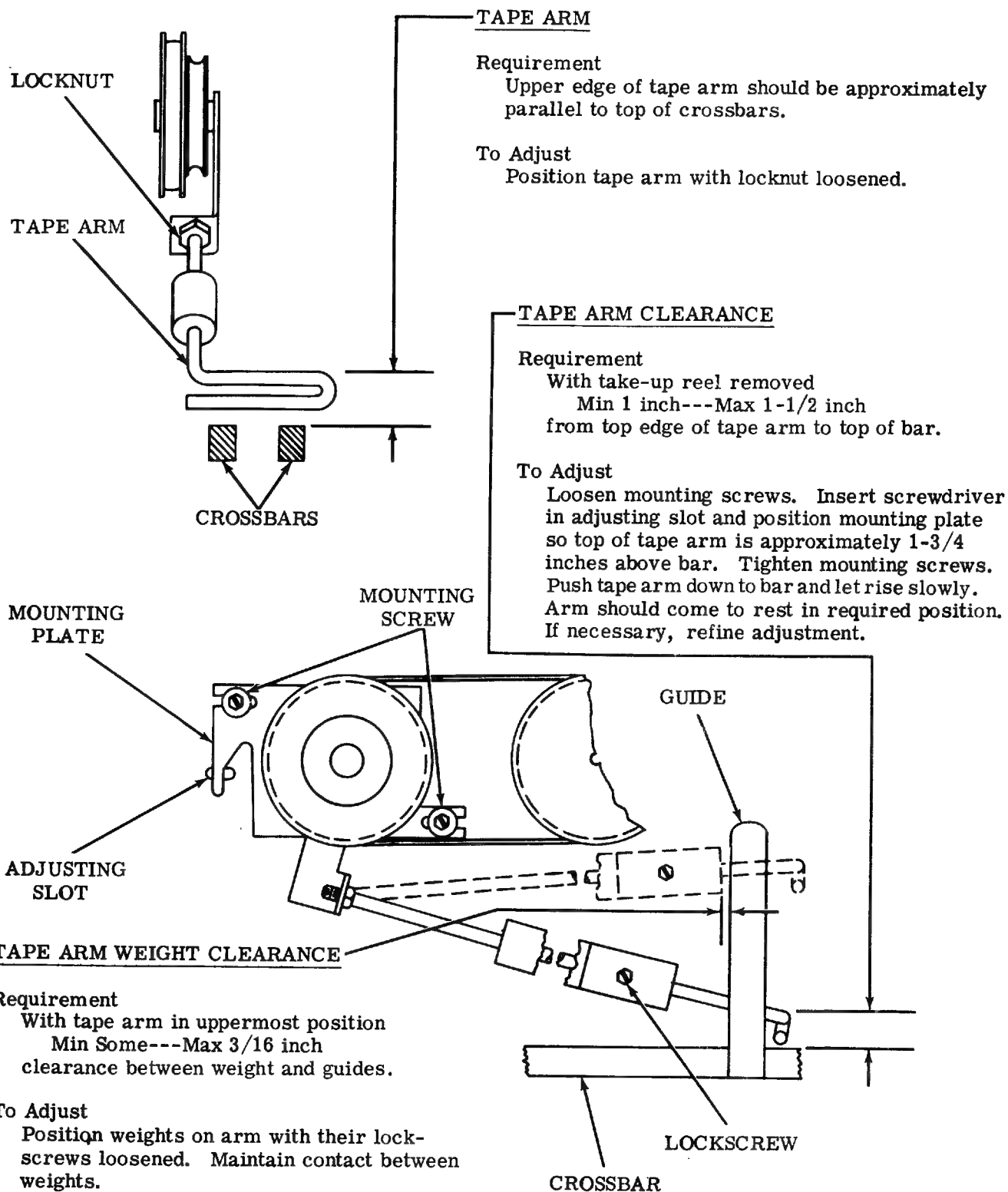
CLUTCH SHAFT

MOUNTING BRACKET

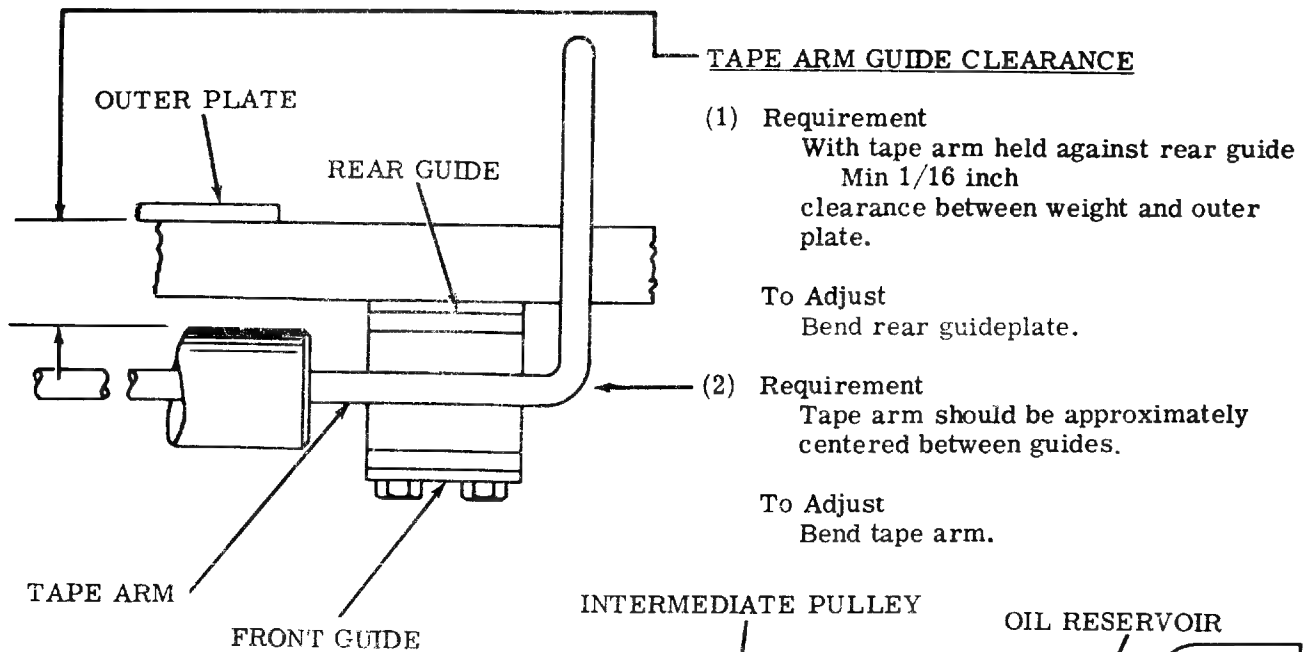
MOUNTING SCREWS (2)

OUTER PLATE

2.21 Tape Control Mechanism

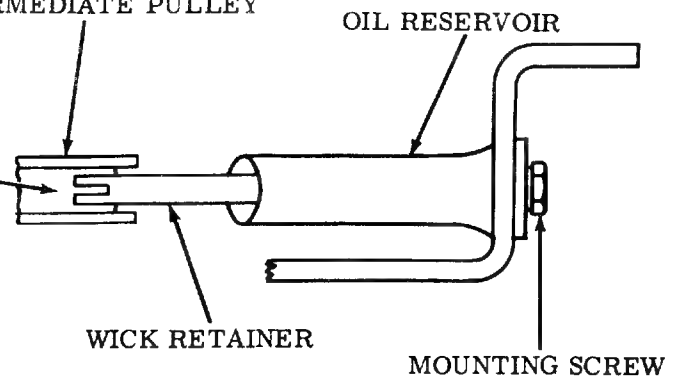


2.22 Tape Control Mechanism (continued)

OIL RESERVOIR

- (1) Requirement
Wick retainer should be approximately
centered on intermediate pulley groove.

To Adjust
Position oil reservoir with mounting
screw loosened.

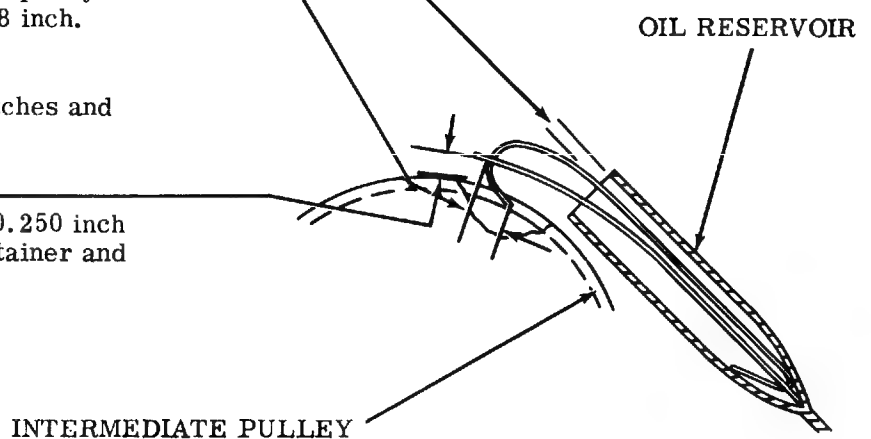


- (2) Requirement
With retainer in its normal position at
bottom of reservoir there should be
some clearance between wick and top
of reservoir.
- (3) Requirement
Portion of wick which rides pulley should
protrude approximately 7/8 inch.

To Adjust
Remove wick from retainer notches and
position to meet requirements.

- (4) Requirement
Min 0.125 inch---Max 0.250 inch
clearance between wick retainer and
intermediate pulley.

To Adjust
Form wick retainer.



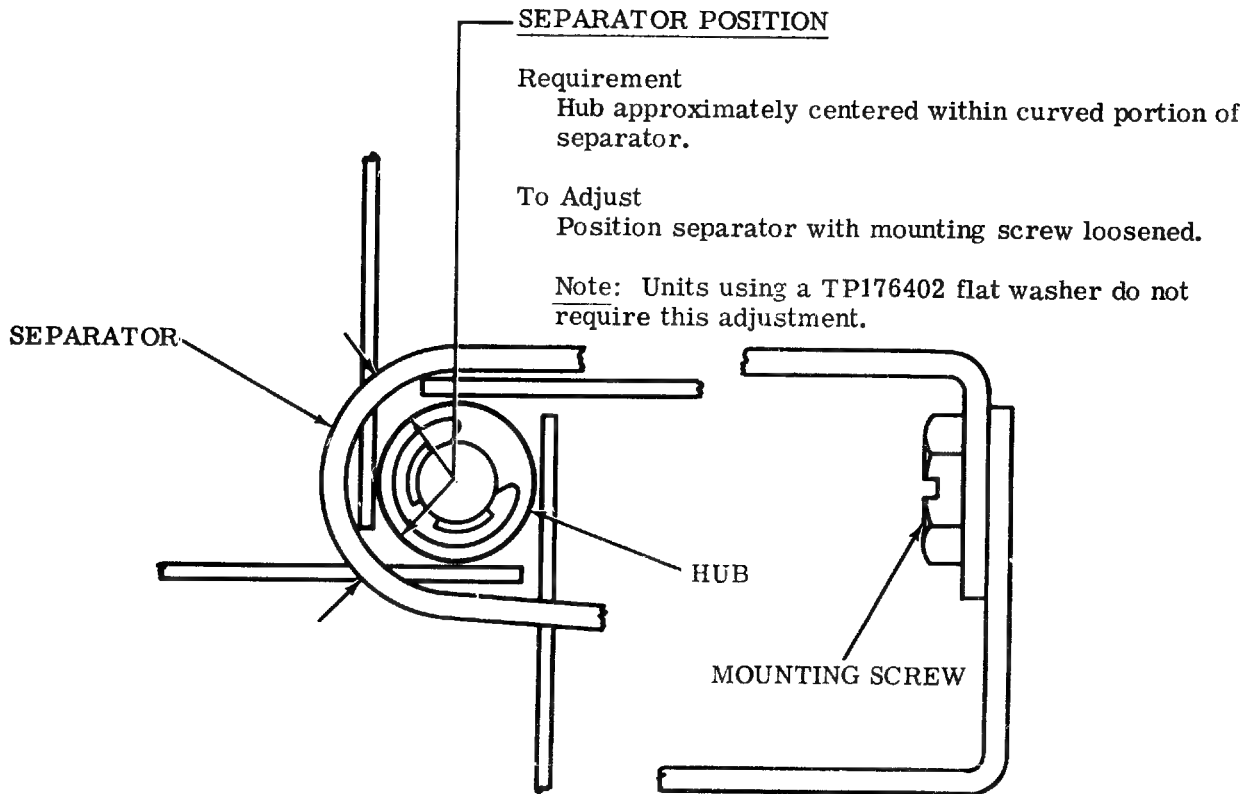
2.23 Tape Control Mechanism (continued)

TAPE SUPPLY REEL SHAFT ENDPLAY - SEE 2.07

TAPE SUPPLY REEL ALIGNMENT - SEE 2.08

TAPE STORAGE BIN SUPPORT BRACKET - SEE 2.09

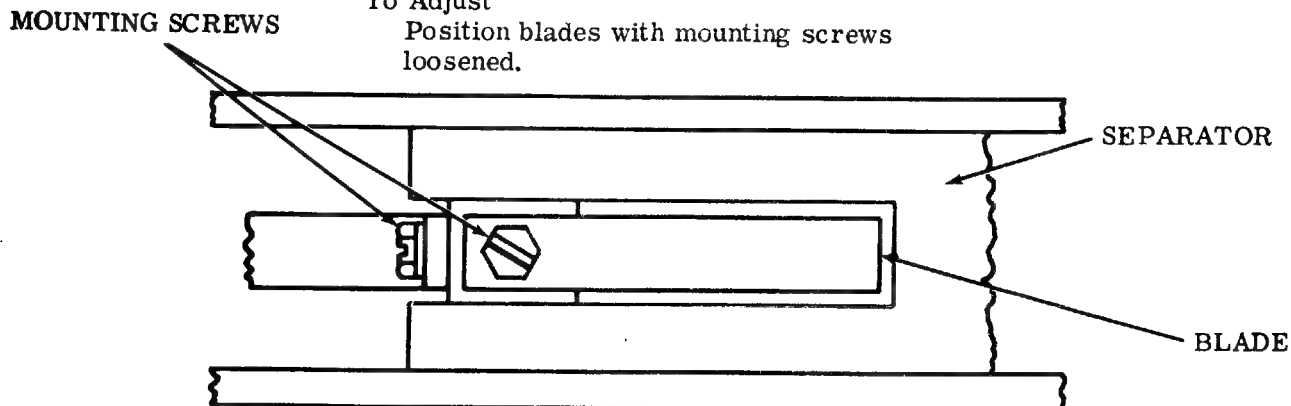
STORAGE BIN DETENT SPRINGS - SEE 2.09



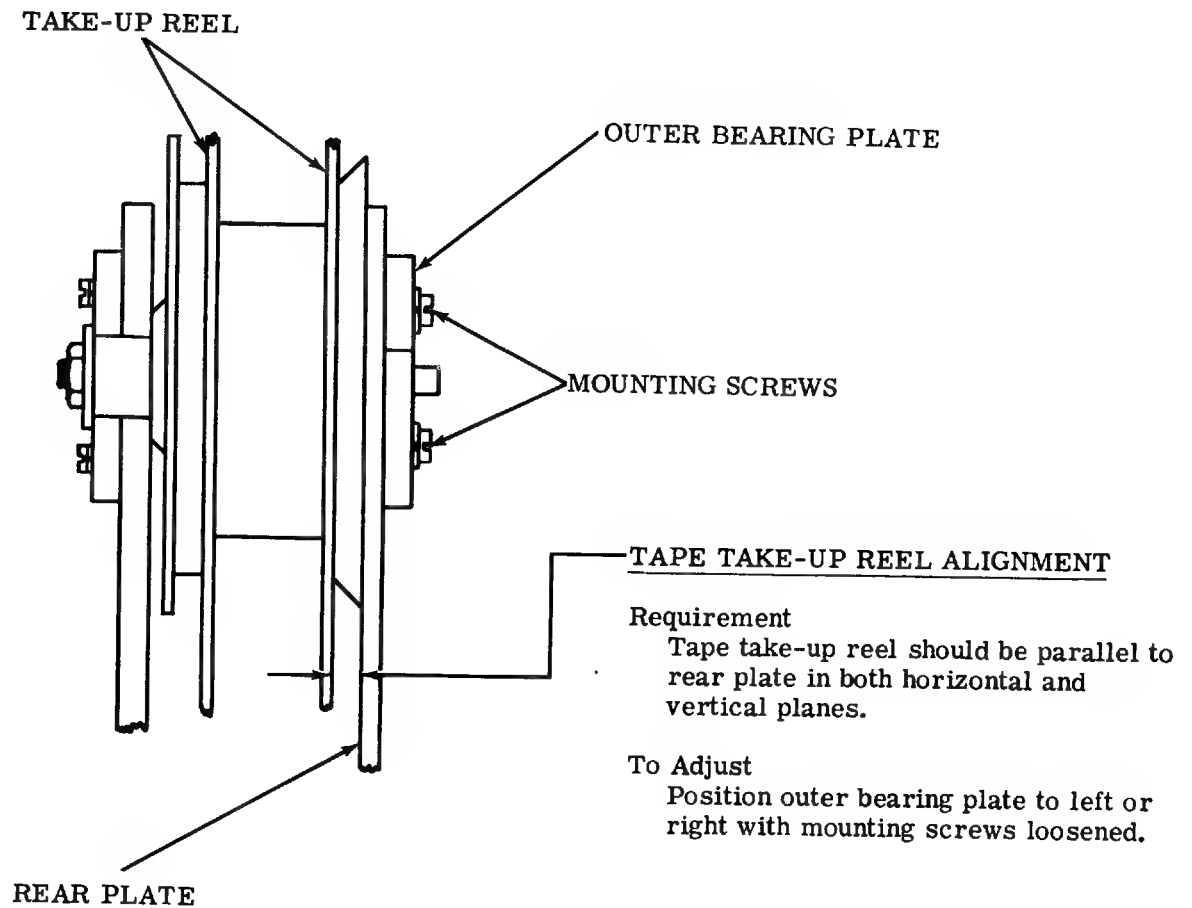
BLADE POSITION

Requirement
Blades should be approximately centered in slot in separator. Check four blades.

To Adjust
Position blades with mounting screws loosened.



2.24 Tape Control Mechanism (continued)



2.25 Tape Control Mechanism (continued)

CONTACT LEAF SPRINGS

Note: While making the following adjustments position detent bracket so protruding posts do not interfere with bakelite extension on leaf spring "D."

- (1) Requirement _____
Leaf spring "D" should be approximately parallel to switch bracket.

To Adjust
Bend leaf spring "D."

- (3) Requirement _____
Gap between nylon button on leaf spring "B" and bakelite extension on leaf spring "D"
Min Some---Max 0.015 inch

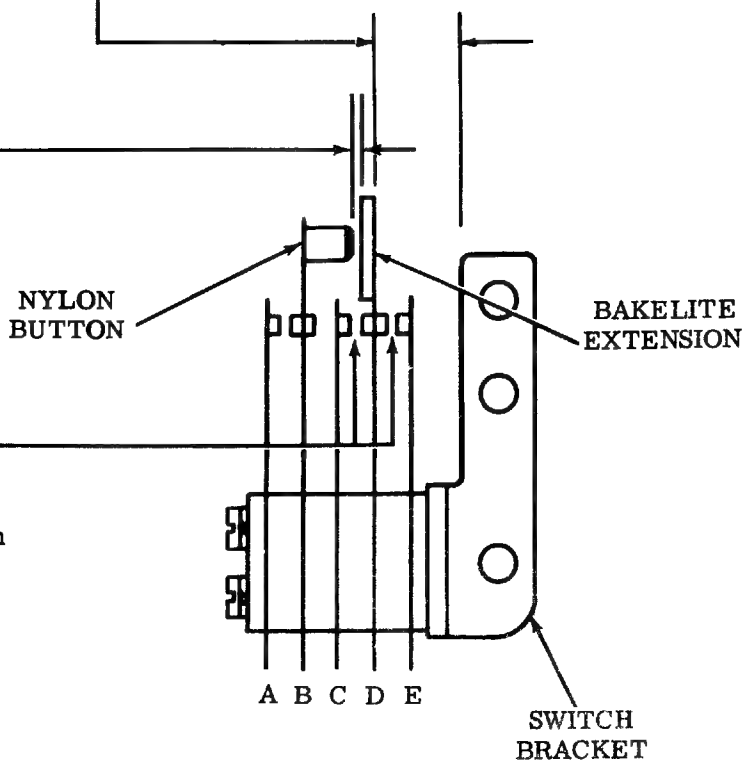
To Adjust
Bend leaf spring "B."

- (2) Requirement _____
Gap between leaf spring contacts "C-D" and "D-E"
Min 0.035 inch---Max 0.045 inch

To Adjust
Bend leaf springs "C" and "E."

- (4) Requirement _____
When bakelite extension on leaf spring "D" is moved to left, contacts "A-B" and "C-D" should close simultaneously (within 0.010 inch).

To Adjust
Bend leaf spring "A."



2.26 Tape Control Mechanism (continued)

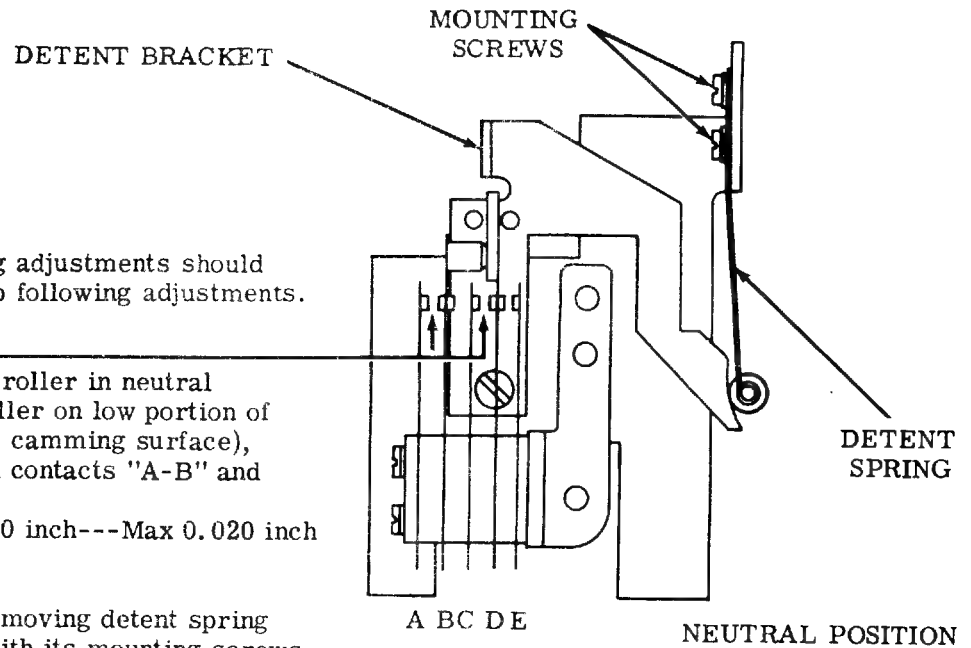
DETENT SPRING

Note: Preceding adjustments should be made prior to following adjustments.

- (1) Requirement _____
 With detent roller in neutral position (roller on low portion of detent lever camming surface), gap between contacts "A-B" and "C-D"
 Min 0.010 inch---Max 0.020 inch

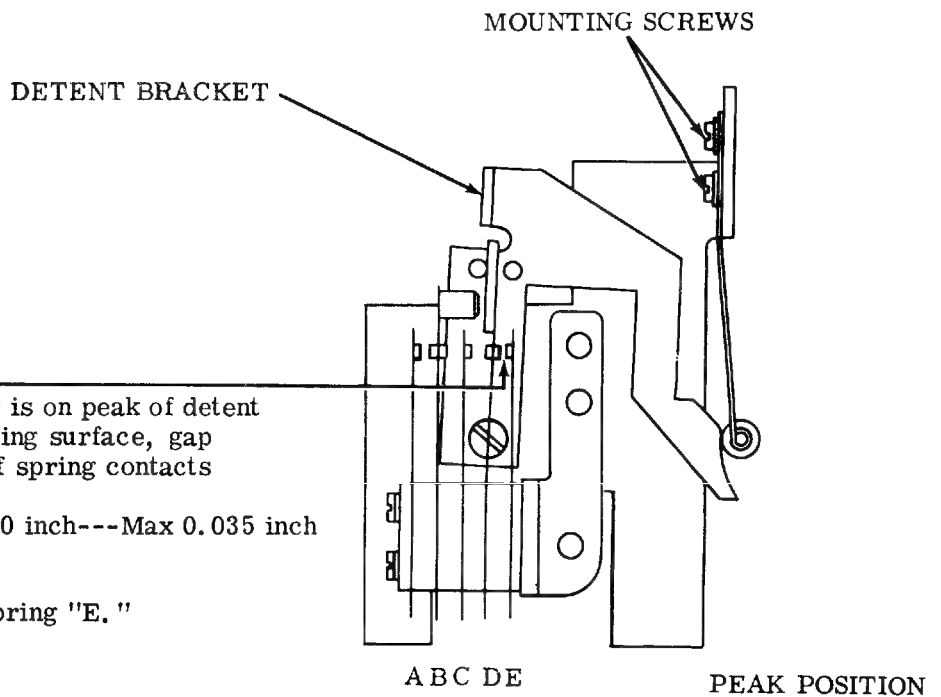
To Adjust
 Position by moving detent spring vertically with its mounting screws loosened.

CAUTION: PRIOR TO TIGHTENING DETENT SPRING MOUNTING SCREWS, CHECK THAT ROLLER RIDES FULLY ON DETENT LEVER CAMMING SURFACE.



- (2) Requirement _____
 When roller is on peak of detent lever camming surface, gap between leaf spring contacts "D-E"
 Min 0.010 inch---Max 0.035 inch

To Adjust
 Bend leaf spring "E."



TIGHT-TAPE ALARM-PRELIMINARY - SEE 2.12

2. 27 Tape Control Mechanism (continued)

***LOW TAPE ALARM**

Requirement

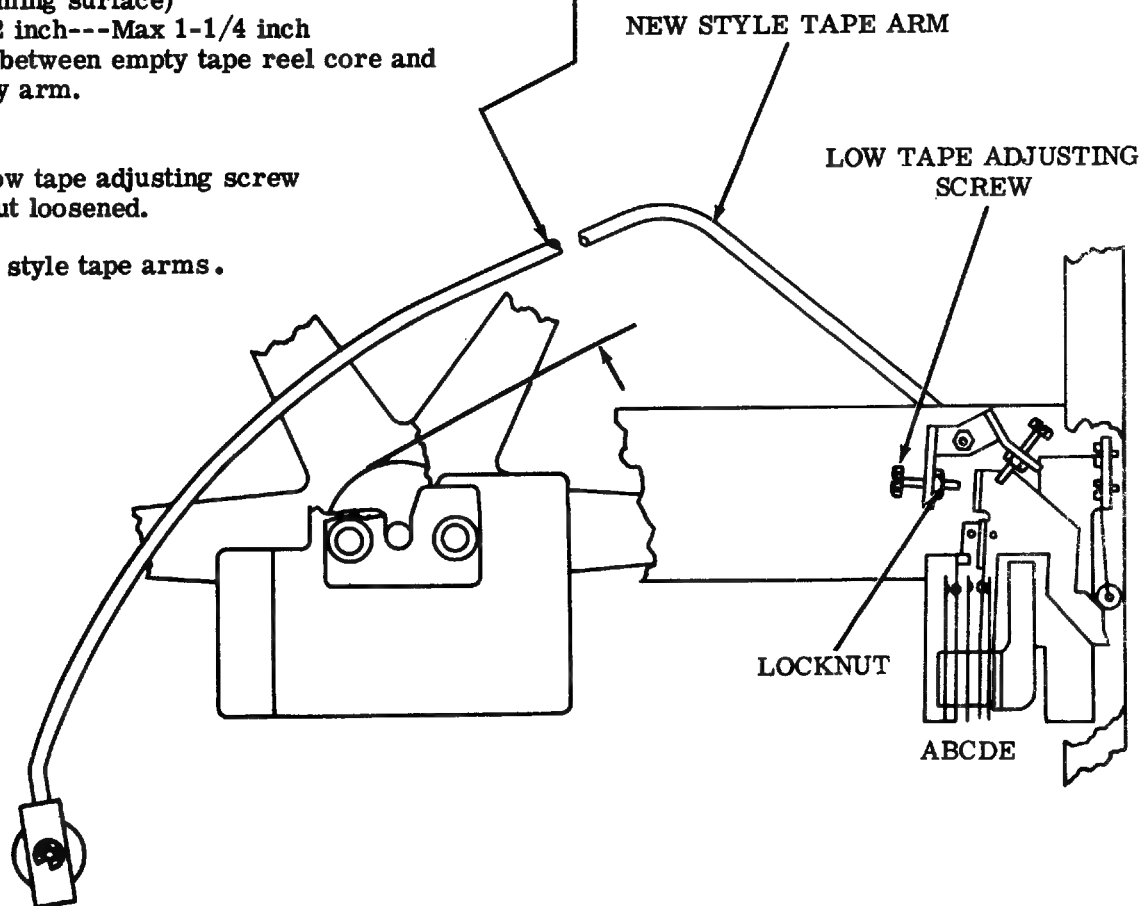
When low tape adjusting screw just closes contacts "D-E" through detent action (roller on peak of detent lever camming surface)

Min 1/2 inch---Max 1-1/4 inch clearance between empty tape reel core and tape supply arm.

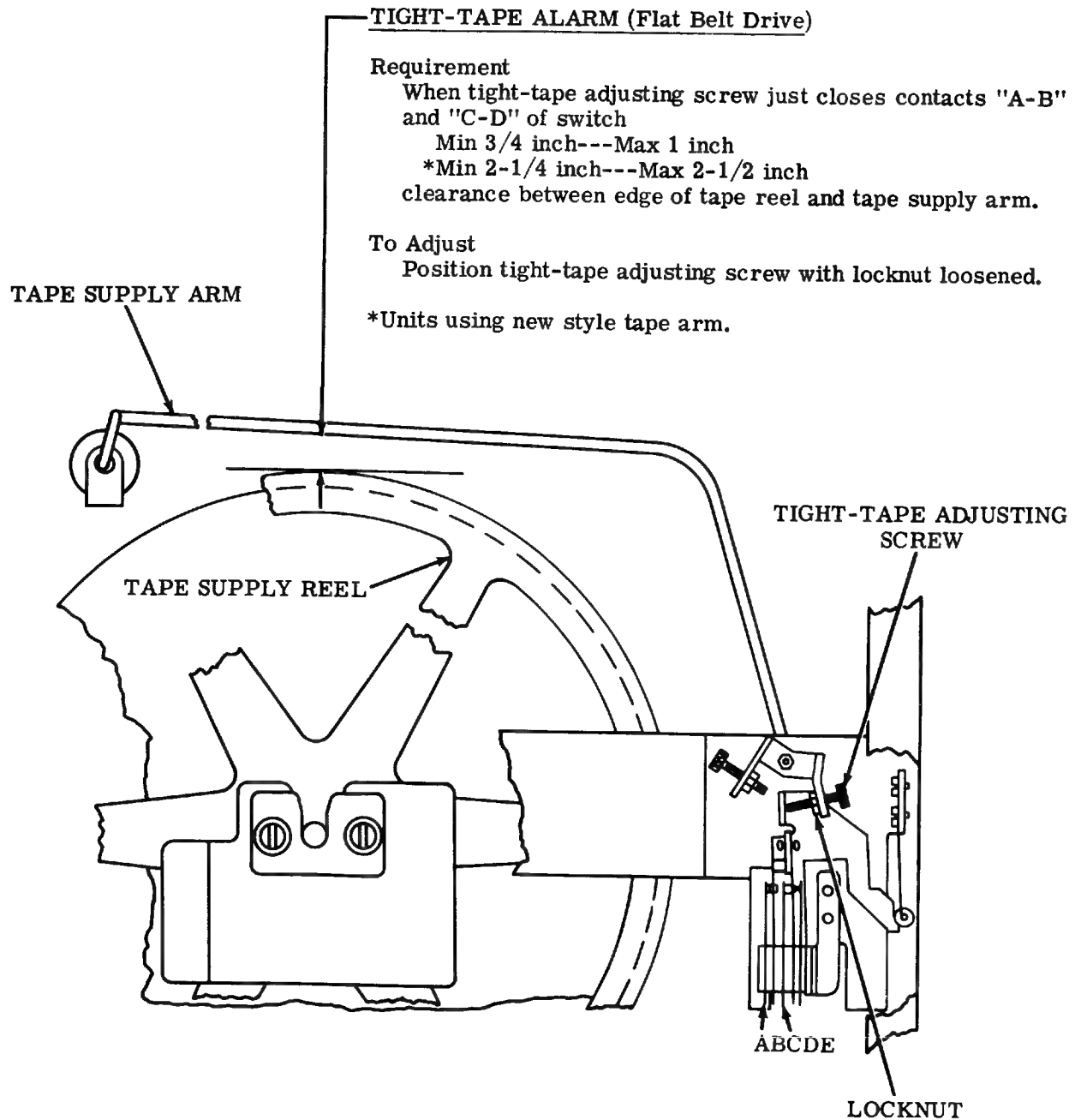
To Adjust

Position low tape adjusting screw with locknut loosened.

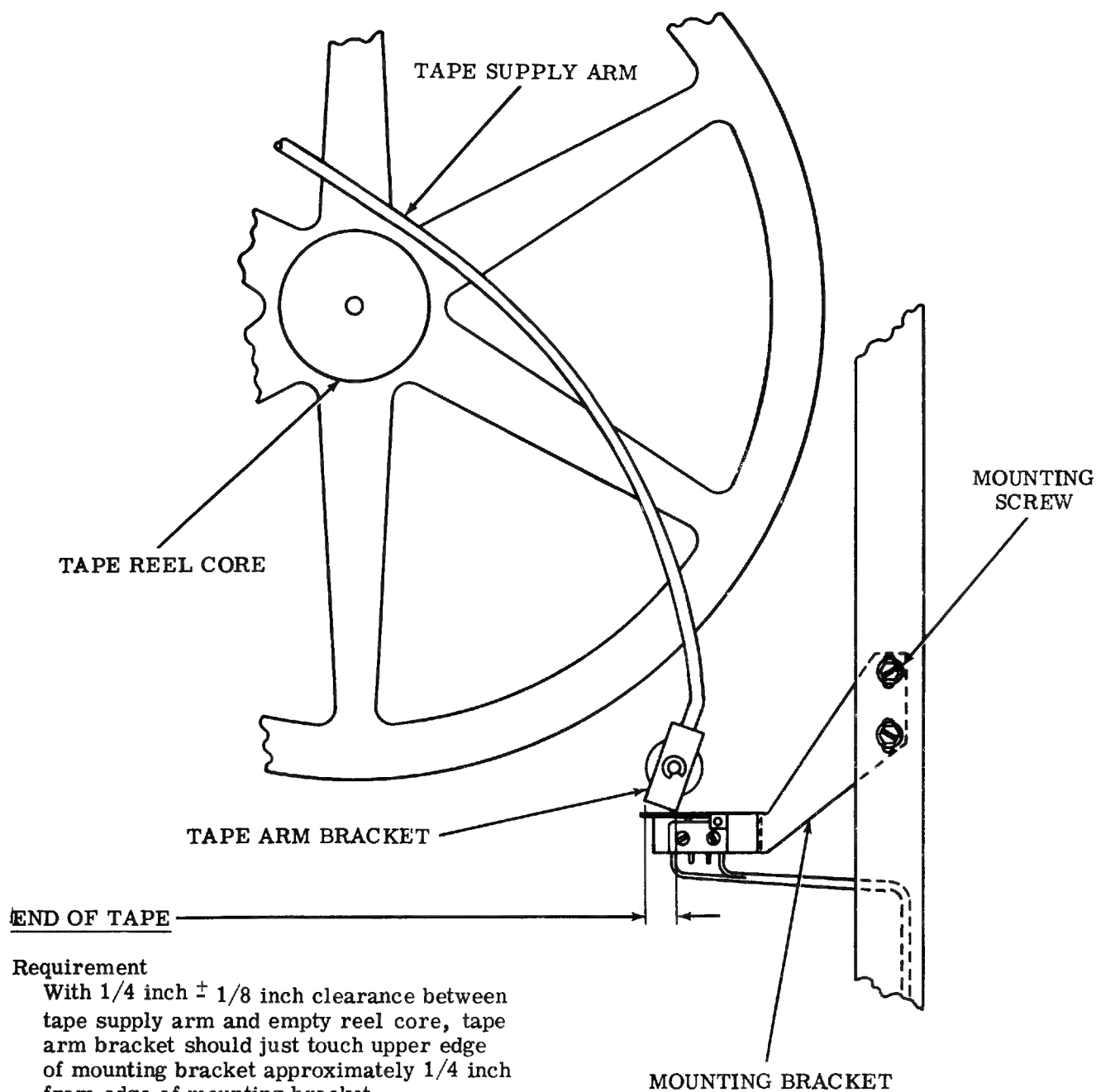
*Old and new style tape arms.



2.28 Tape Control Mechanism (continued)



2.29 Tape Control Mechanism (continued)



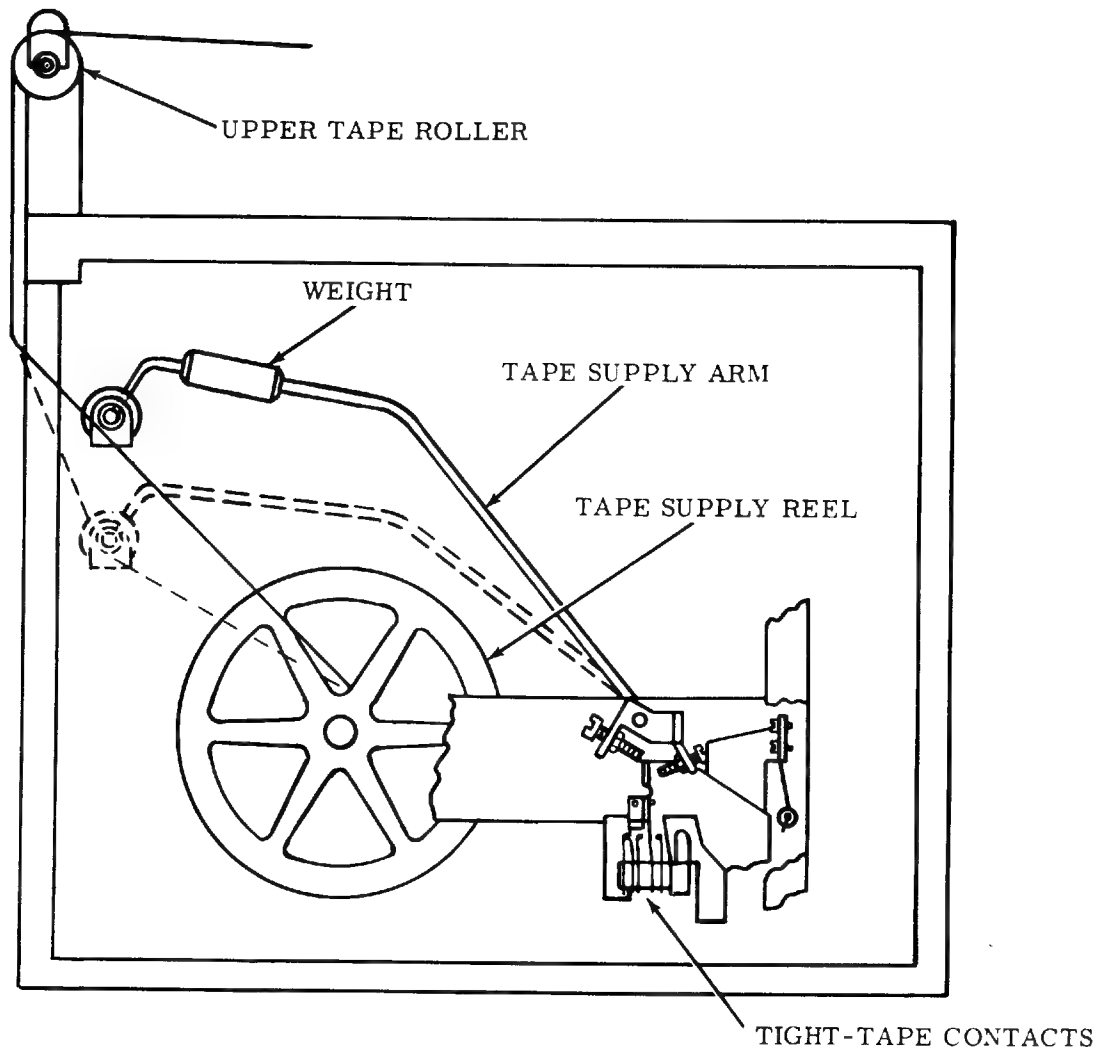
Requirement

With $1/4$ inch \pm $1/8$ inch clearance between tape supply arm and empty reel core, tape arm bracket should just touch upper edge of mounting bracket approximately $1/4$ inch from edge of mounting bracket.

To Adjust

With mounting screws loosened, position mounting bracket up or down to meet requirement. Slight bending of tape arm may be necessary.

2.30 Tape Control Mechanism (continued)

TIGHT-TAPE ALARM (HIGH-TO-LOW SPEED)

(1) Requirement

With tape routed as in 5.03, HIGH TO LOW SPEED REPERFORATOR TRANSMITTER SET, cause a taut tape condition between upper roller and empty roll of tape on the tape supply reel. Lower tape supply arm by loosening tape held at upper tape roller by about five character lengths (5/10 inch). At this position, tight-tape alarm contacts must be closed. Loosen tape an additional three character lengths (3/10 inch). Contacts should open.

To Adjust

Loosen tight-tape switch adjusting screw locknut. Position adjusting screw to meet requirement. Tighten locknut.

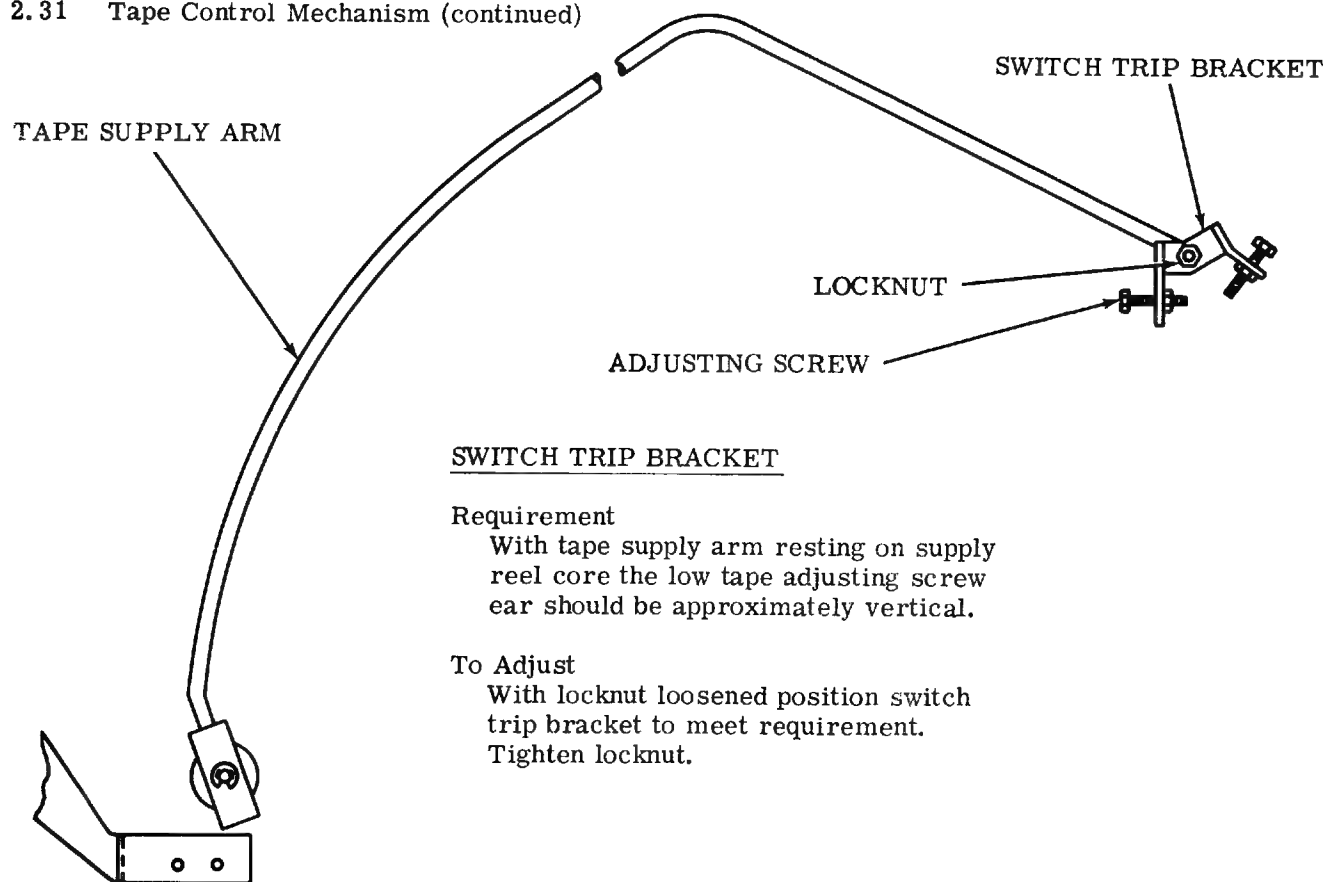
(2) Requirement

Tight-tape alarm condition should not occur when the reperforator pulls tape from a full tape supply reel.

To Adjust

Loosen screw on weight. Position weight toward roller to meet requirement. Tighten screw.

2.31 Tape Control Mechanism (continued)



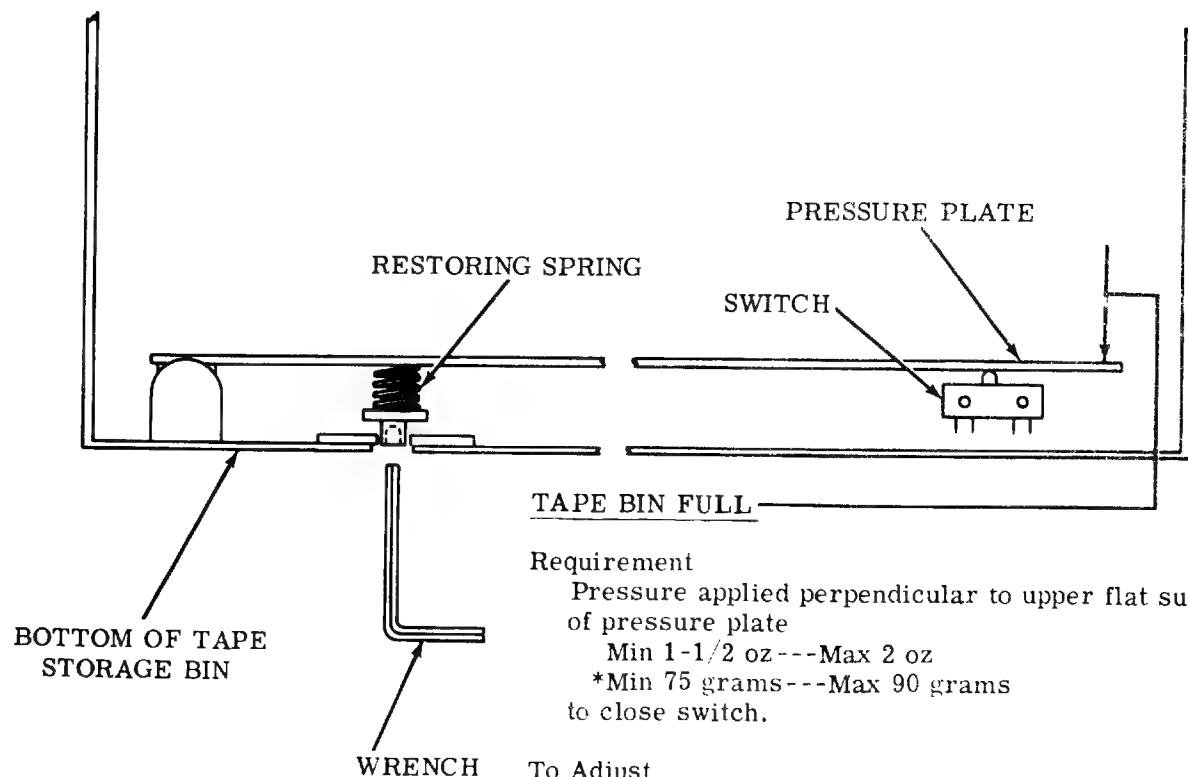
SWITCH TRIP BRACKET

Requirement

With tape supply arm resting on supply reel core the low tape adjusting screw ear should be approximately vertical.

To Adjust

With locknut loosened position switch trip bracket to meet requirement. Tighten locknut.



Requirement

Pressure applied perpendicular to upper flat surface of pressure plate
 Min 1-1/2 oz ---Max 2 oz
 *Min 75 grams ---Max 90 grams
 to close switch.

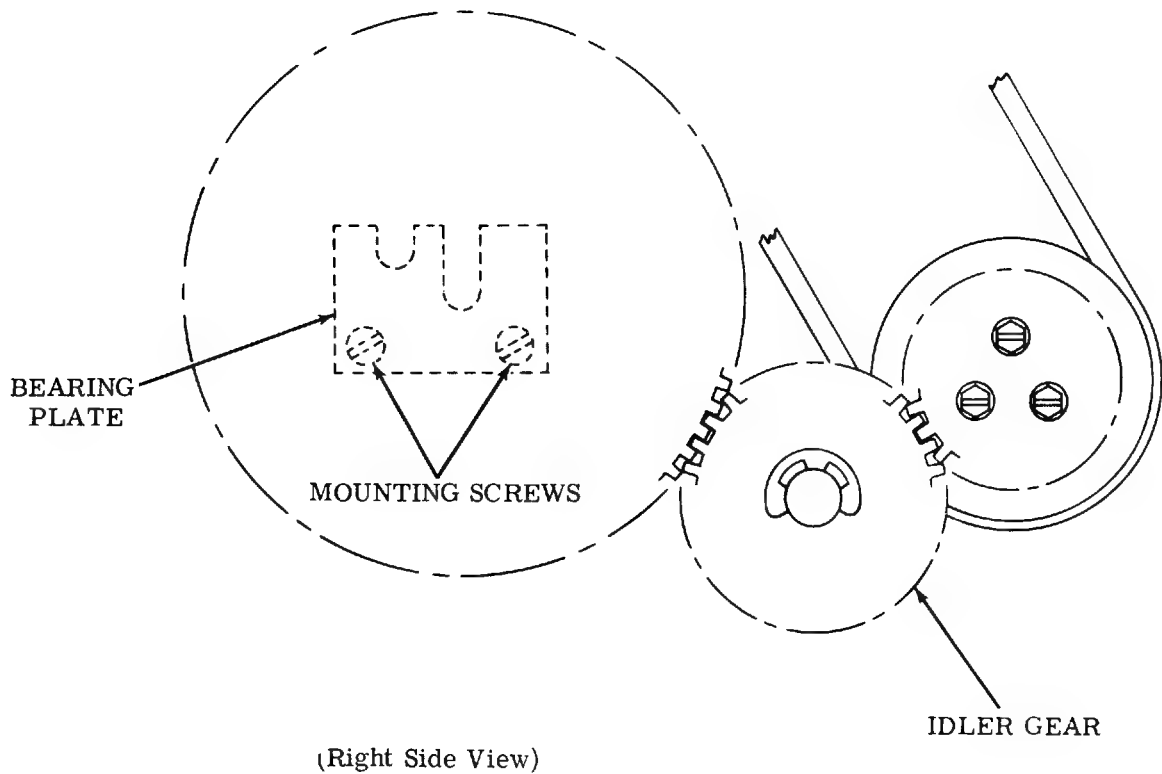
To Adjust

Insert wrench into socket. Turn left or right to increase or decrease force bearing against pressure plate.

*Units with V belt drive.

HIGH SPEED TAPE HANDLING STAND (V BELT WINDER)

2.32 Tape Drive Mechanism

TAPE TAKE-UP REEL ASSEMBLY GEAR AND IDLER GEAR MESH**Requirement**

With take-up reel in position, there should be a barely perceptible amount of backlash between tape reel assembly gear and idler gear at point where backlash is least.

To Adjust

With mounting screws loosened, position bearing bracket (attached to left side frame) to meet requirement.

2.33 Tape Control Mechanism

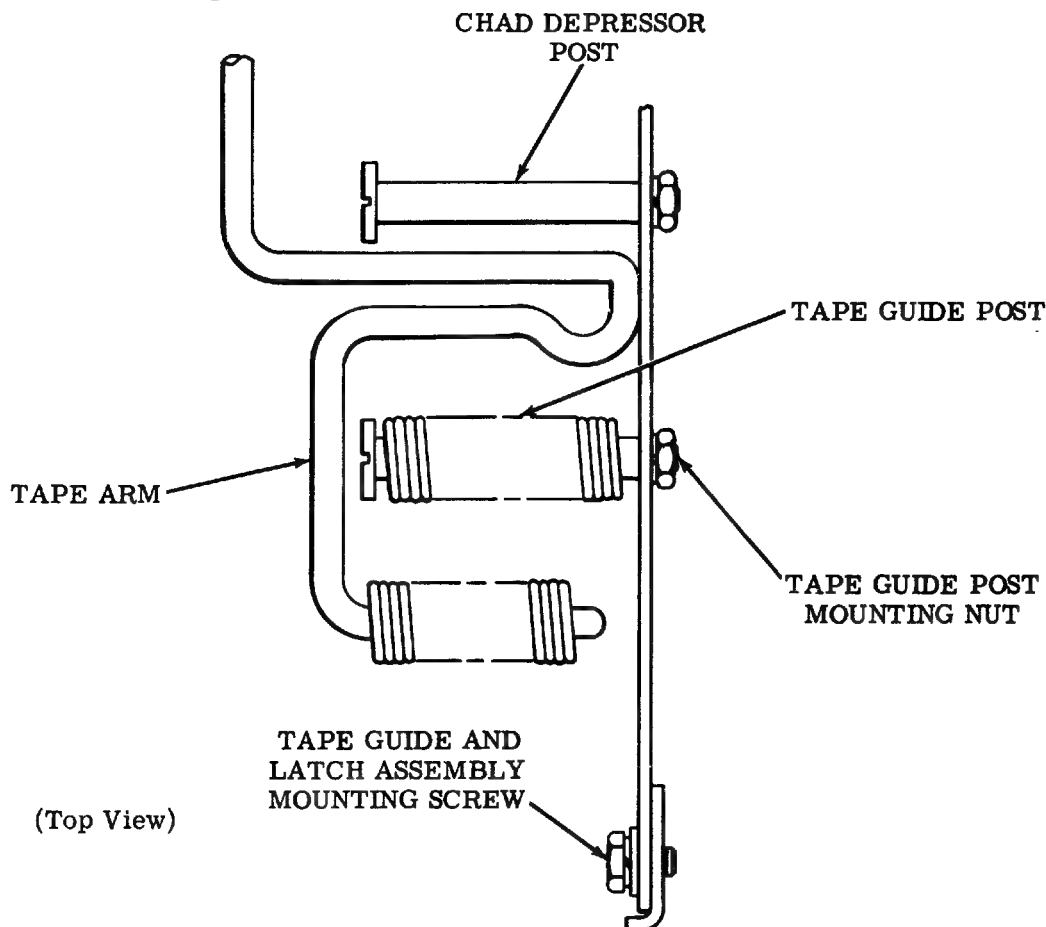
TAPE ARM

Requirement

Tape guiding edge of tape arm should be approximately parallel to tape guide posts.

To Adjust

Bend tape guide arm to meet requirement.



TAPE GUIDE AND CHAD DEPRESSOR BRACKET

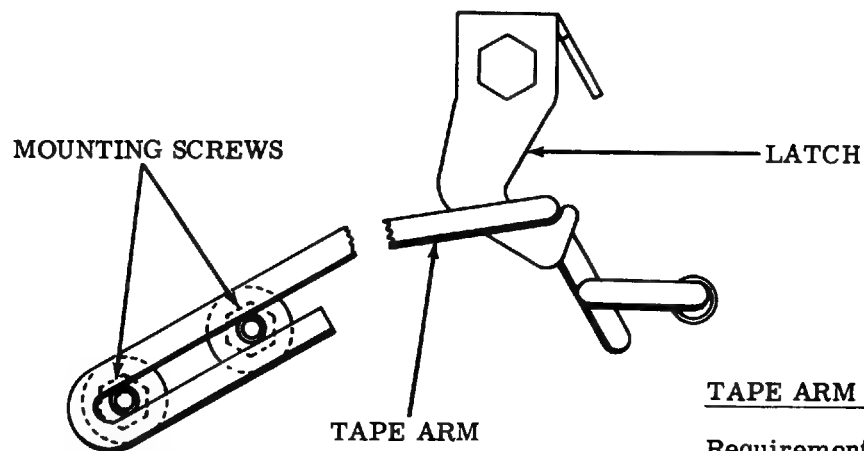
Requirement

Align tape guiding edges of tape arm with chad depressor post and tape guide post. The edges of tape arm and posts should be equally spaced from each other, as gauged by eye.

To Adjust

Loosen tape guide post mounting nut. Position tape guide post to meet requirement. If requirement cannot be met, loosen tape guide and latch assembly mounting screws and move assembly up or down to meet requirement. Recheck tape arm latch adjustment.

2.34 Tape Control Mechanism (continued)



(Left Side View)

TAPE ARM LATCH**Requirement**

When tape arm is moved upward against its stop and then released, the tape arm should be fully engaged by its latch.

To Adjust

With tape arm mounting screws loosened, slide tape arm in or out to obtain full engagement.

2.35 Tape Drive Mechanism (continued)

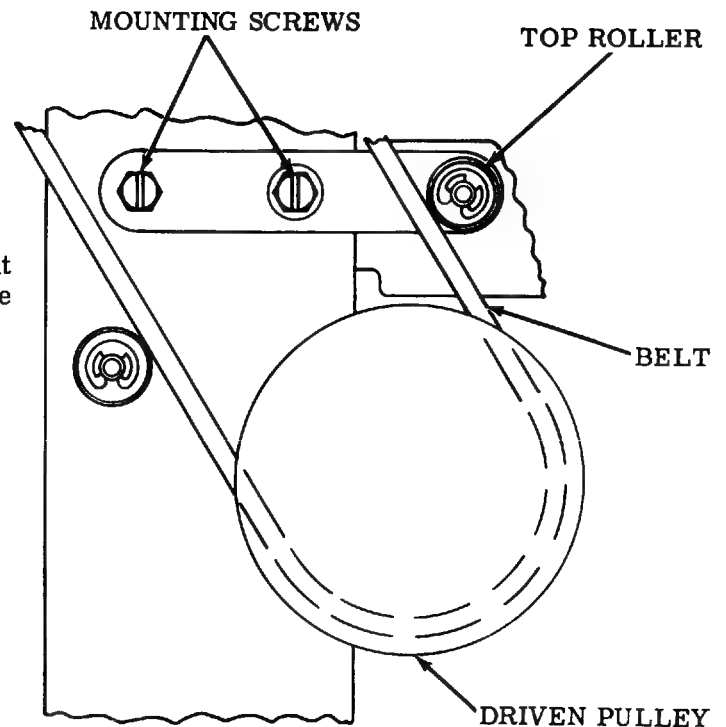
DRIVEN PULLEY BELT GUIDE ROLLER**Requirement**

With V belt held taut, top driven pulley belt guide roller should just touch outer surface of belt.

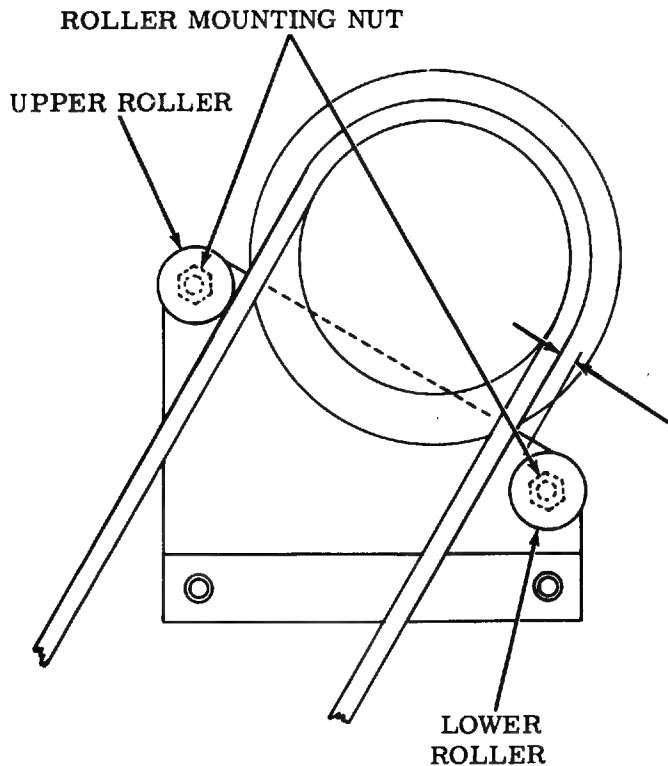
To Adjust

Loosen guide roller arm mounting screws. Rotate roller arm to meet requirement.

(Right Side View)



2.36 Tape Drive Mechanism (continued)



(Left Side View)

DRIVER PULLEY BELT UPPER
GUIDE ROLLER

Requirement

With V belt held taut, upper driver pulley belt guide roller should just touch outer surface of belt.

To Adjust

Loosen roller mounting nut. Position roller to meet requirement.

DRIVER PULLEY BELT LOWER
GUIDE ROLLER

Requirement

With V belt held taut, driver pulley belt lower guide roller should be approximately 1/16 inch from outer surface of belt.

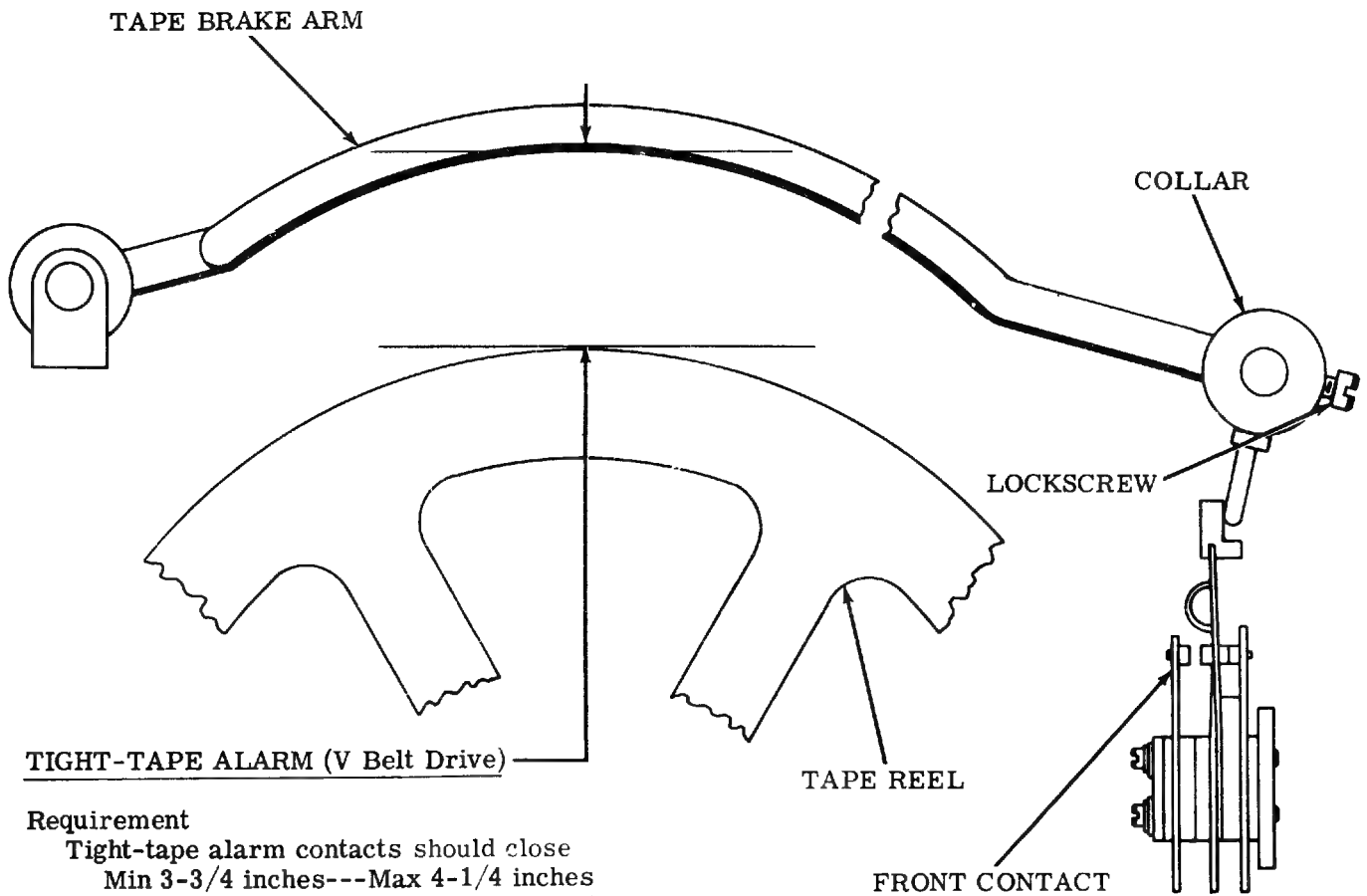
To Adjust

Loosen roller mounting nut. Position roller to meet requirement.

TAPE SUPPLY REEL ALIGNMENT - SEE 2.08

TAPE SUPPLY REEL SHAFT ENDPLAY - SEE 2.07

2.37 Tape Control Mechanism (continued)

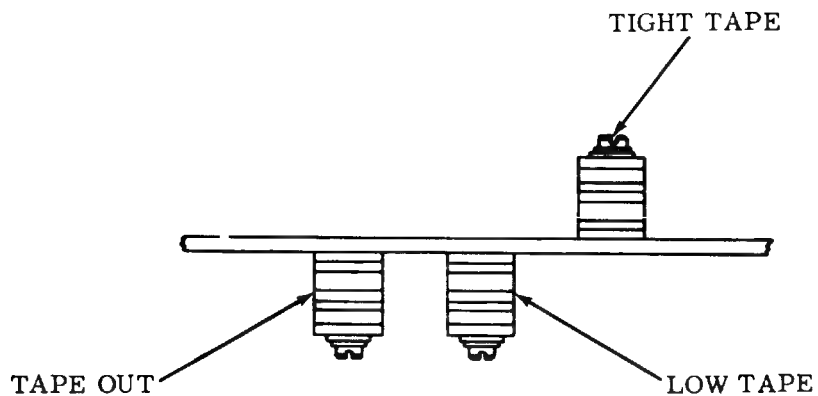
**Requirement**

Tight-tape alarm contacts should close
 Min 3-3/4 inches---Max 4-1/4 inches
 clearance between edge of tape reel and tape
 brake arm.

To Adjust

With tight-tape contact operating post collar
 lock screw loosened, position post so that
 swinger contact transfers from front contact
 to rear contact. Tighten lock screw.

(Right Side View)



(Rear Top View)

TAPE CONTACT ARRANGEMENT

2.38 Tape Control Mechanism (continued)

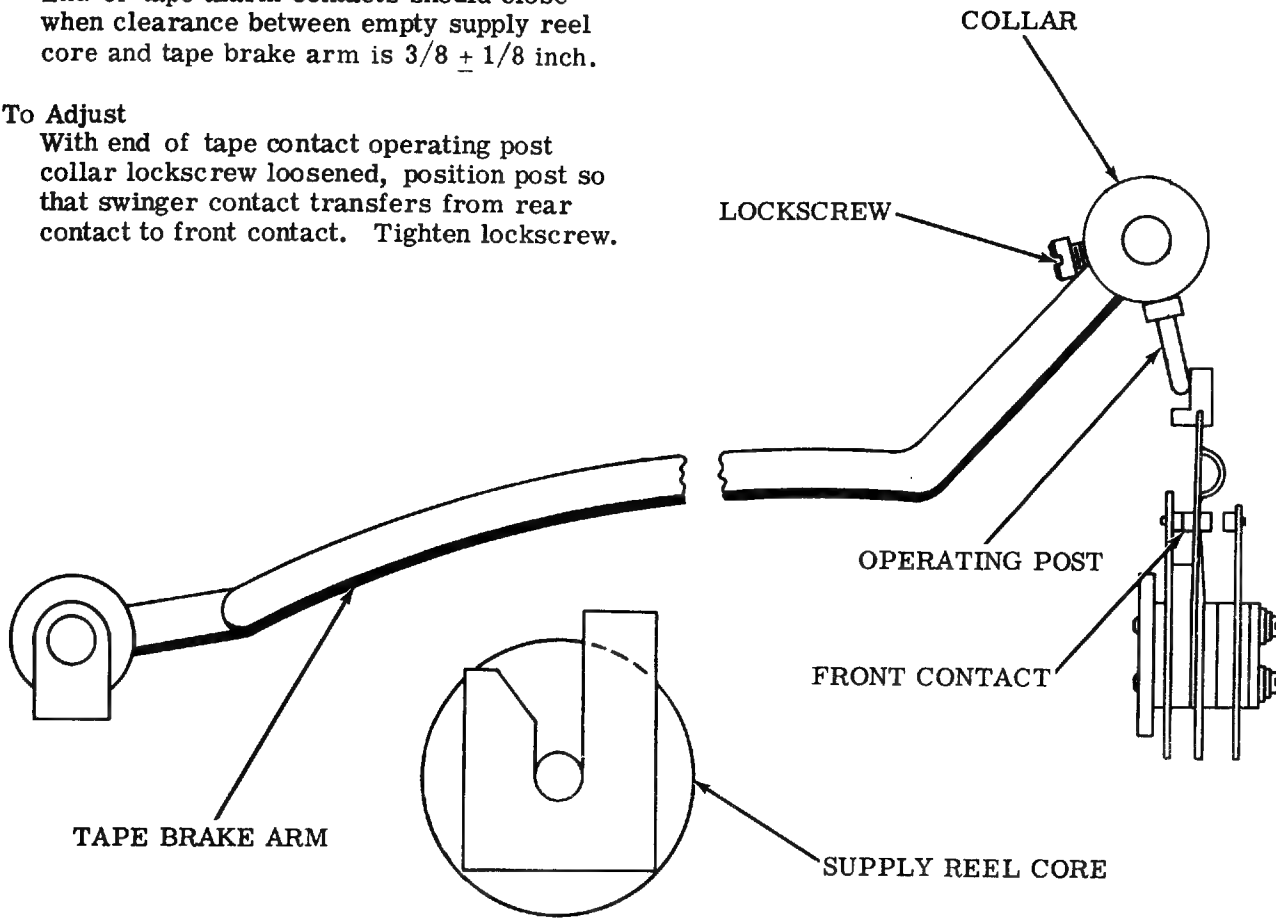
END OF TAPE CONTACT

Requirement

End of tape alarm contacts should close when clearance between empty supply reel core and tape brake arm is $\frac{3}{8} \pm \frac{1}{8}$ inch.

To Adjust

With end of tape contact operating post collar lock screw loosened, position post so that swinger contact transfers from rear contact to front contact. Tighten lock screw.



(Right Side View)

LOW TAPE CONTACT

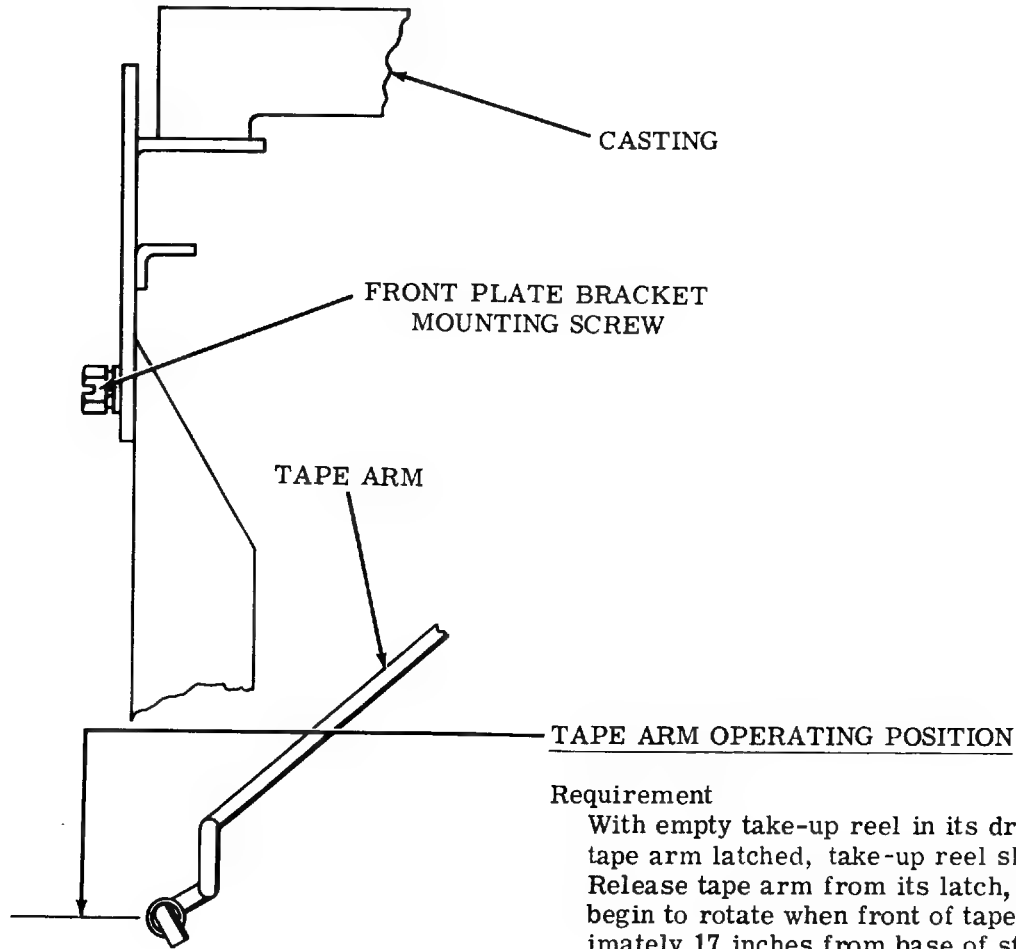
Requirement

Low tape alarm contacts should close
Min $\frac{1}{2}$ inch---Max $1\frac{1}{4}$ inches
clearance between empty supply reel core and
tape brake arm.

To Adjust

With low tape contact operating post collar lock screw loosened, position post so that swinger contact transfers from rear contact to front contact. Tighten lock screw.

2.39 Tape Control Mechanism (continued)

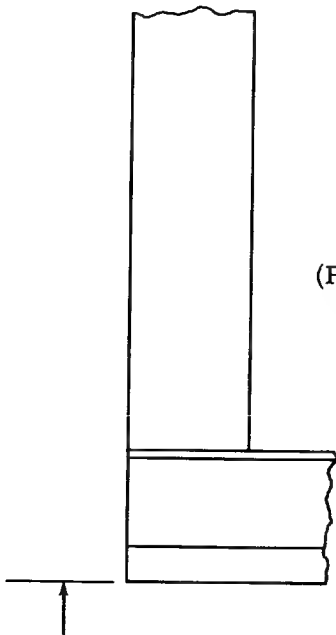
**Requirement**

With empty take-up reel in its driving position and tape arm latched, take-up reel should not rotate. Release tape arm from its latch, the reel should begin to rotate when front of tape arm is approximately 17 inches from base of stand.

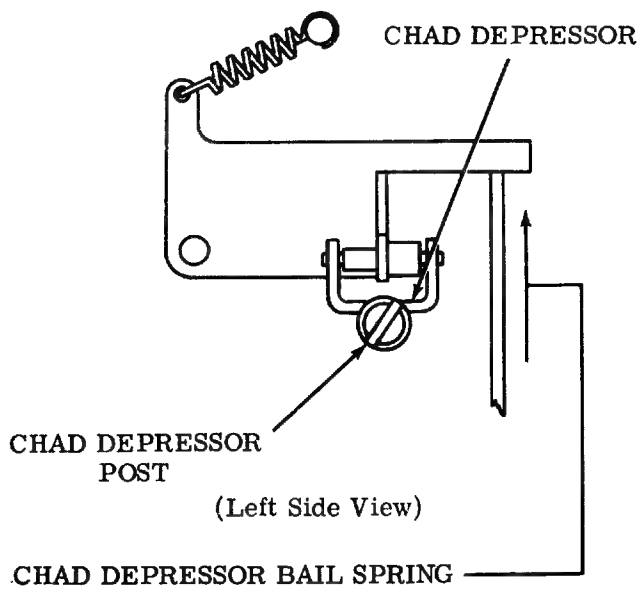
To Adjust

With front plate bracket mounting screws loosened, position bracket to meet requirement. If requirement cannot be met it may be necessary to bend tape arm. Recheck tape arm adjustments.

(Right Side View)

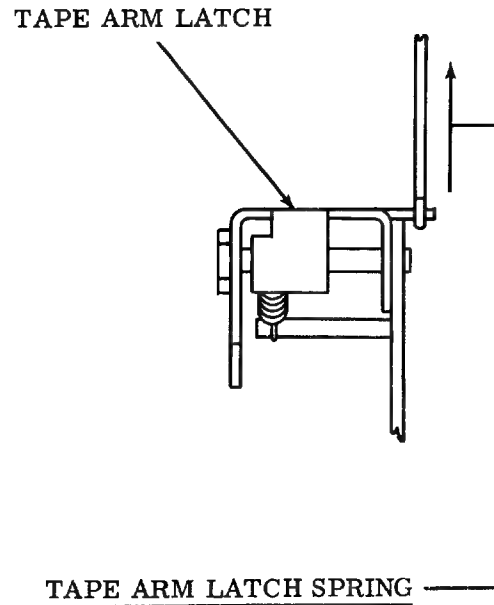


2.40 Tape Control Mechanism (continued)



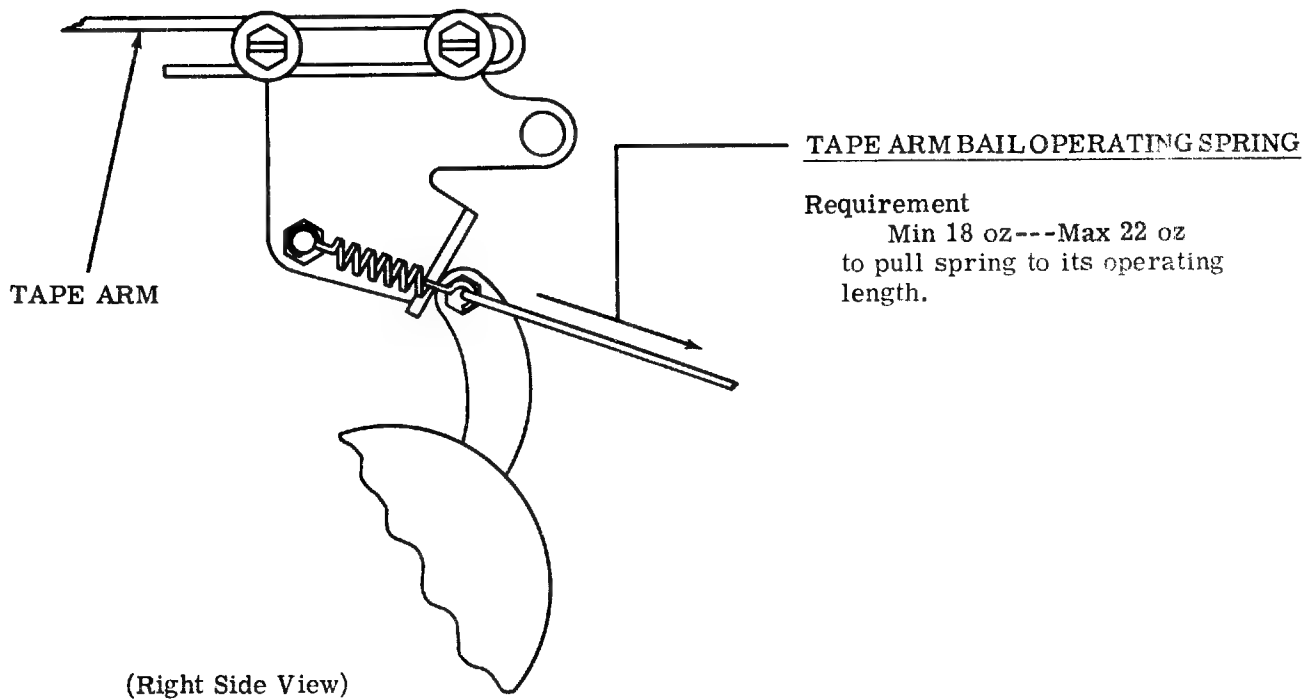
Requirement

Min 6 oz---Max 10 oz
to pull depressor away from
downstop post.



Requirement

Min 1-1/2 oz---Max 2-1/2 oz
to start latch moving.

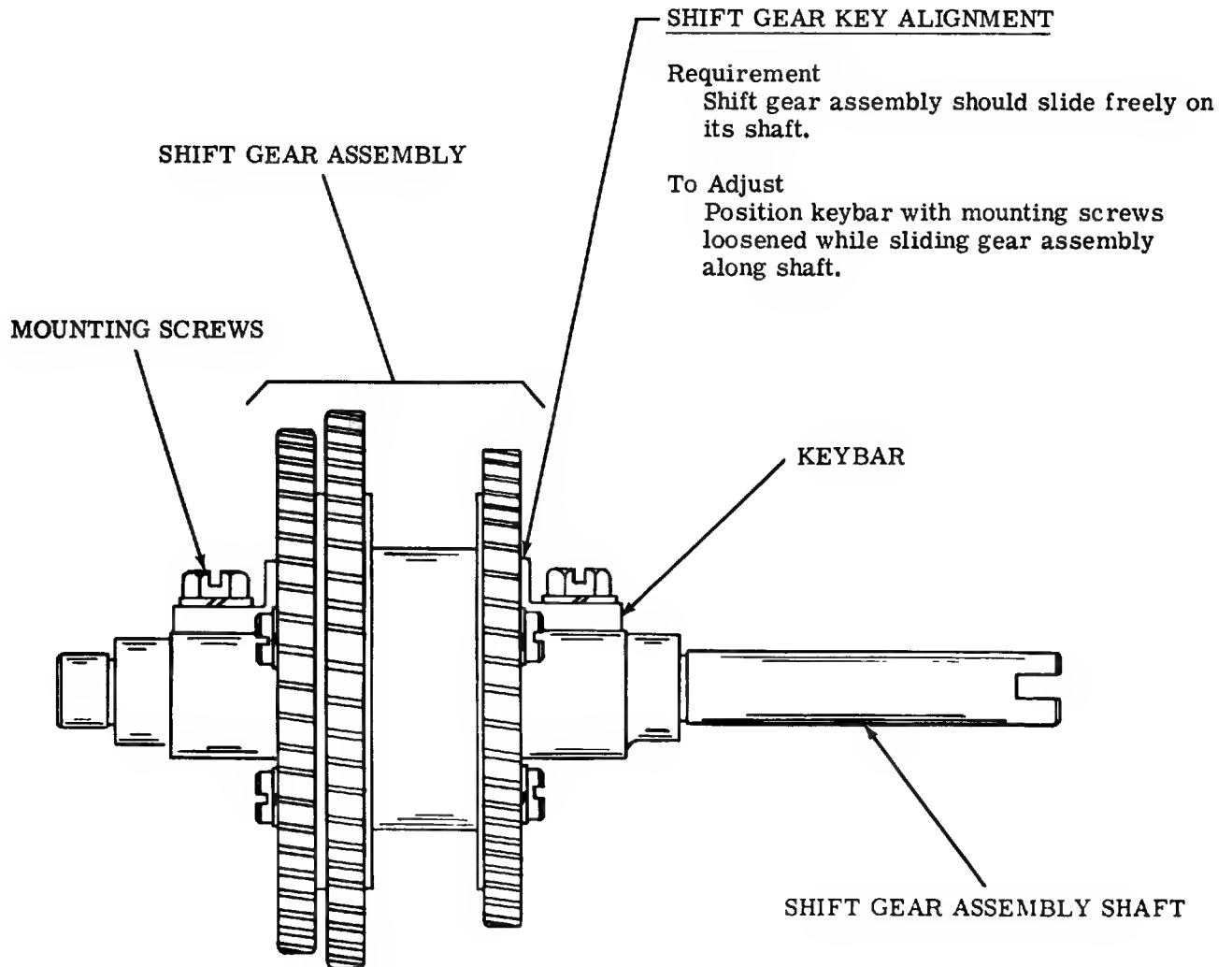


Requirement

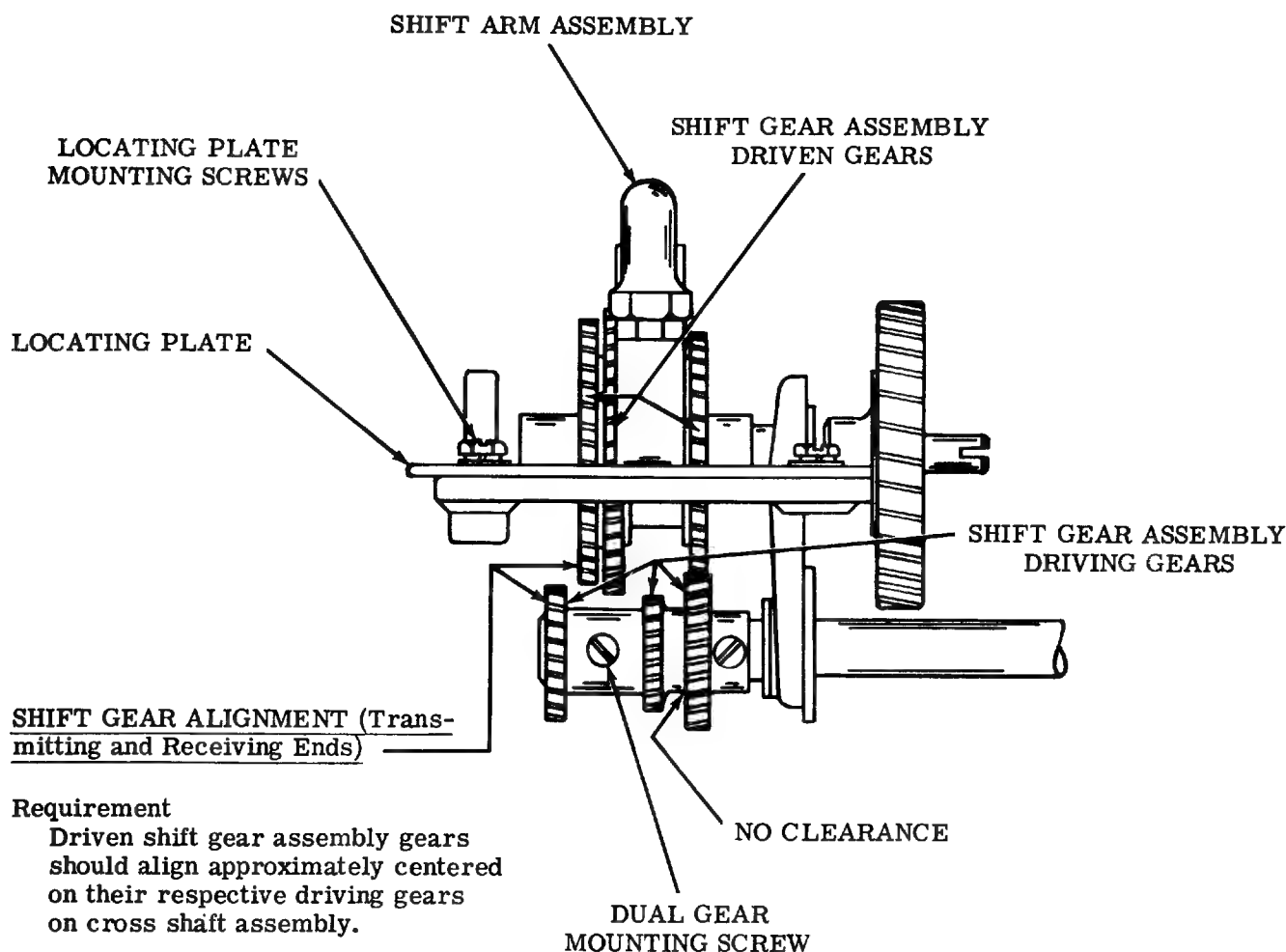
Min 18 oz---Max 22 oz
to pull spring to its operating
length.

3. REPERFORATOR TRANSMITTER BASE

3.01 Tape Drive Mechanism



3.02 Tape Drive Mechanism (continued)



Requirement

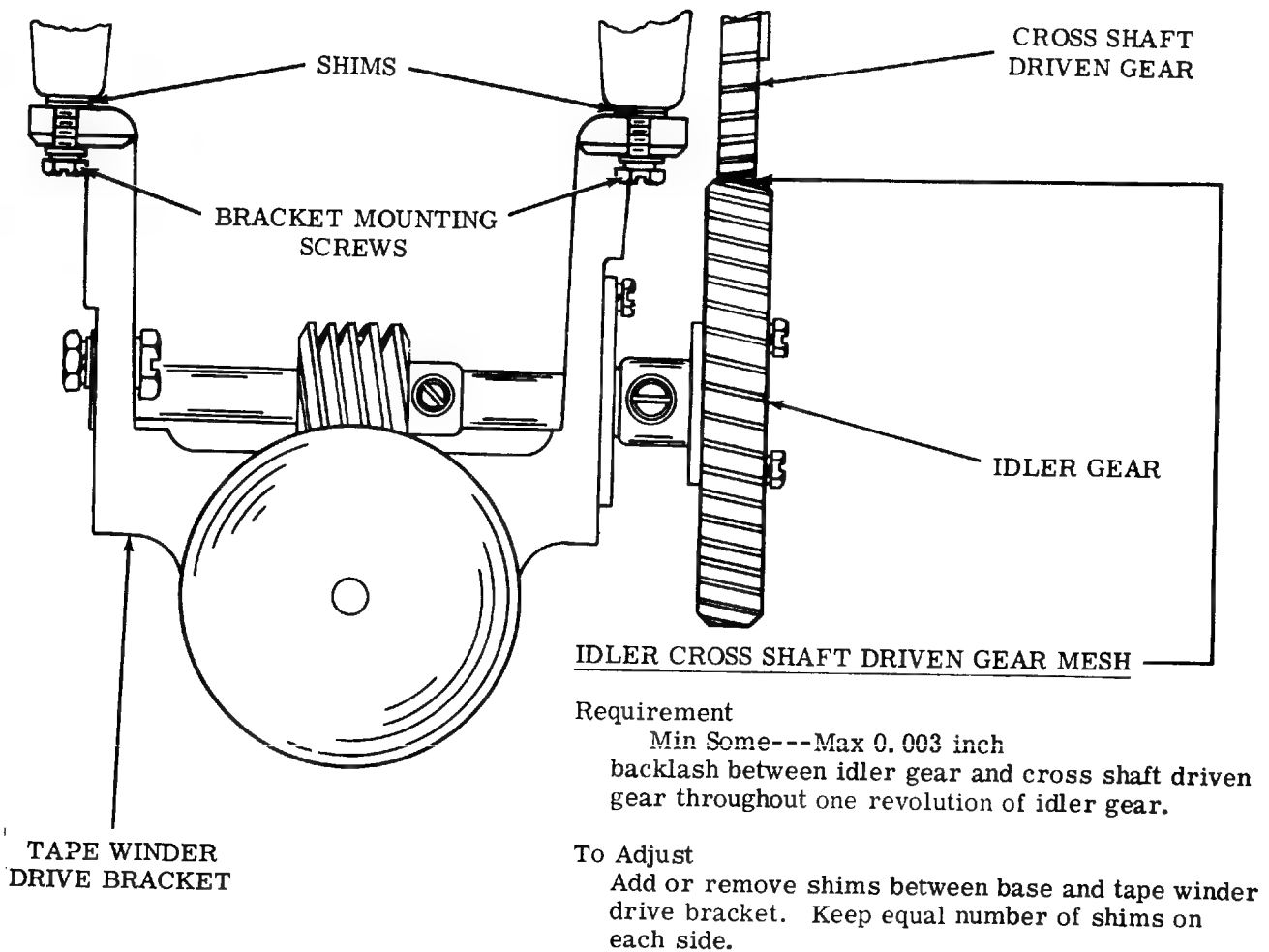
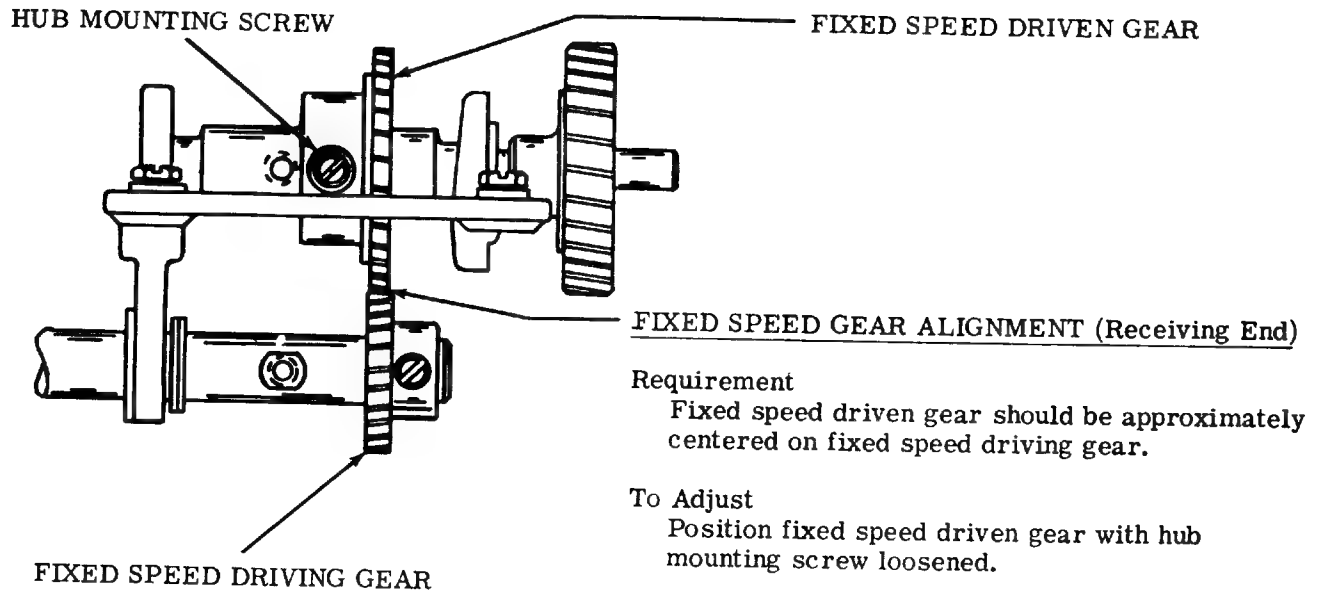
Driven shift gear assembly gears should align approximately centered on their respective driving gears on cross shaft assembly.

To Adjust

Position locating plate with mounting screws loosened. Check three shift positions.

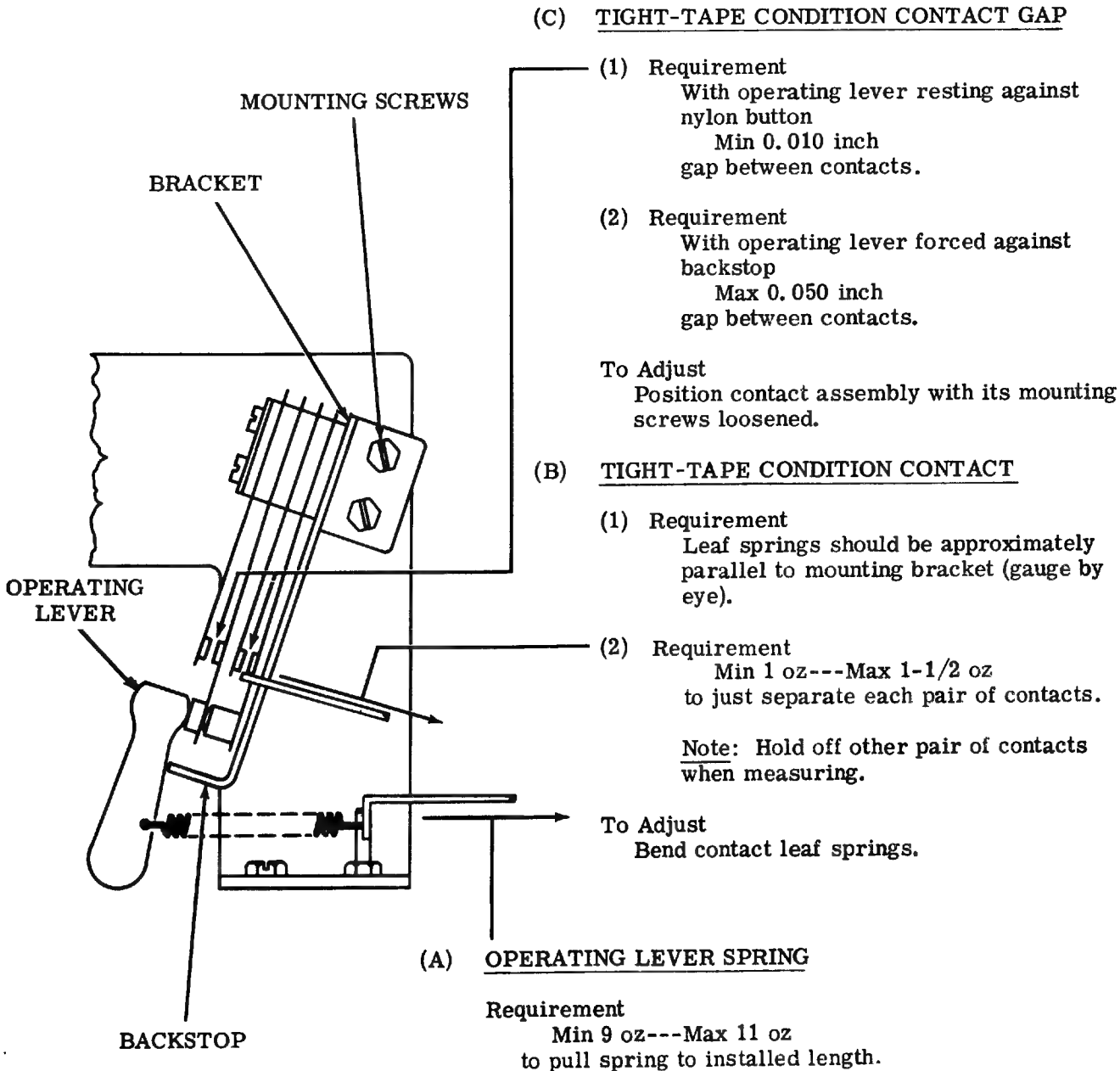
Note: Make certain that the two portions of the shift gears on the cross shaft assembly are mounted with no clearance between them. If there is clearance, loosen dual gear mounting screw and eliminate clearance before making above adjustment.

3.03 Tape Drive Mechanism (continued)



3.04 Tape Control Mechanism

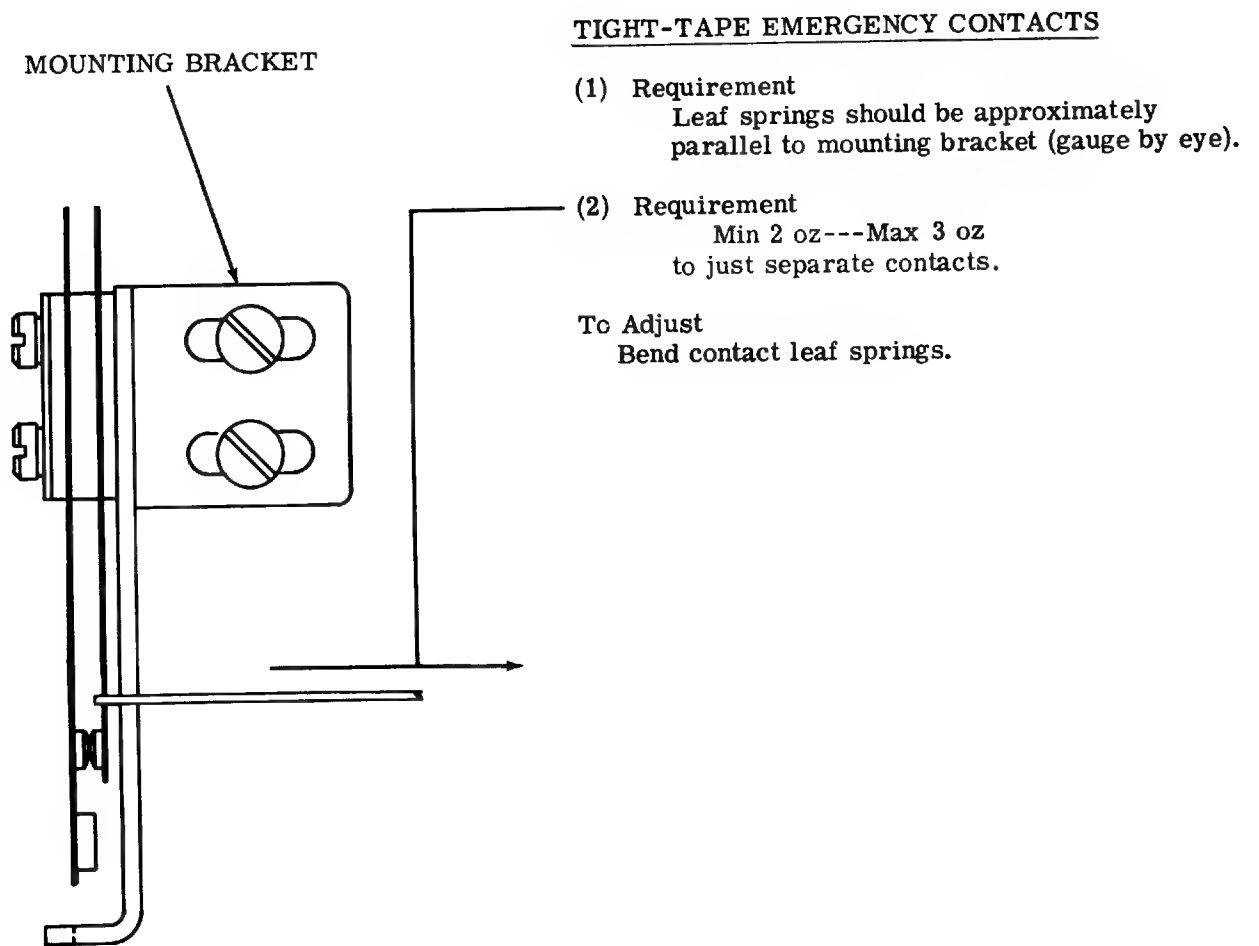
Note: Adjustments on this page pertain only to high to low speed units, ie, those capable of receiving data at 1000 wpm and transmitting at standard line speeds of 60, 75, or 100 wpm



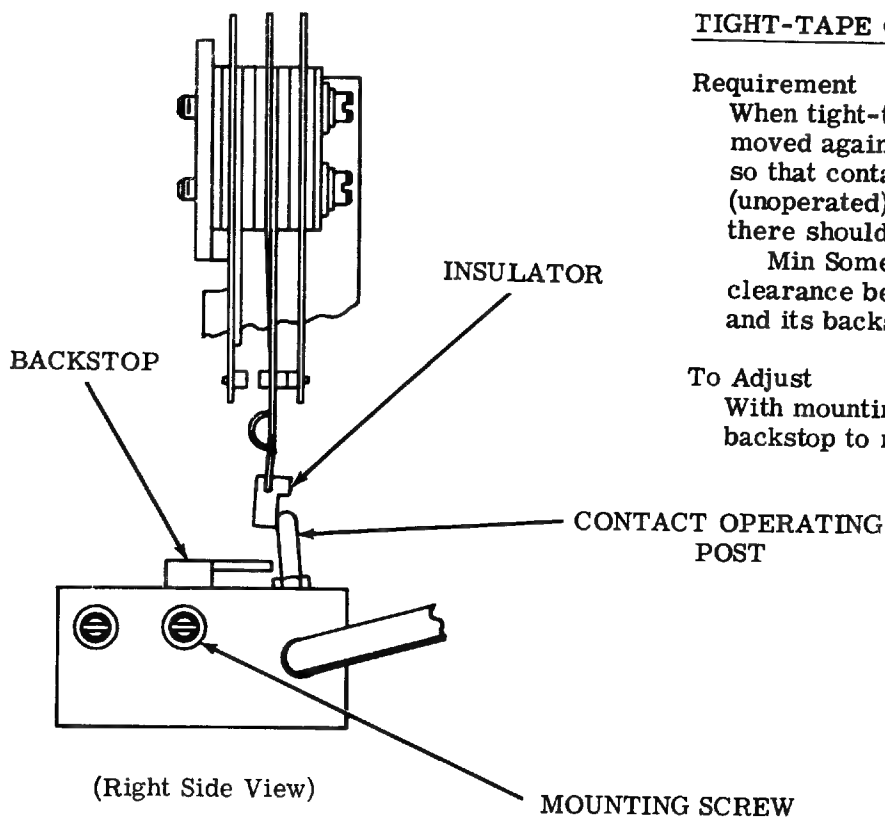
(View From Rear of Unit)

3.05 Tape Control Mechanism (continued)

Note: Adjustments on this page pertain only to high to low speed units, ie, those capable of receiving data at 1000 wpm and transmitting at standard line speeds of 60, 75, or 100 wpm



3.06 Tape Control Mechanism (continued)



TIGHT-TAPE CONTACT BACKSTOP

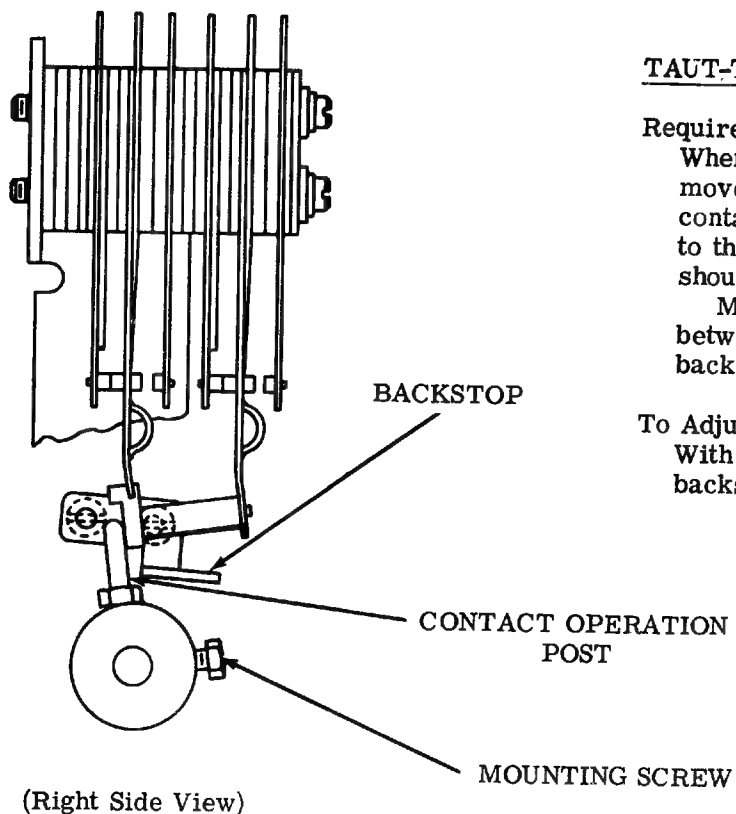
Requirement

When tight-tape contact operating post is moved against insulator on operating swinger so that contacts transfer from left (unoperated) to right (operated) position, there should be

Min Some---Max 0.010 inch clearance between contact operating post and its backstop.

To Adjust

With mounting screws loosened, position backstop to meet requirement.



TAUT-TAPE CONTROL

Requirement

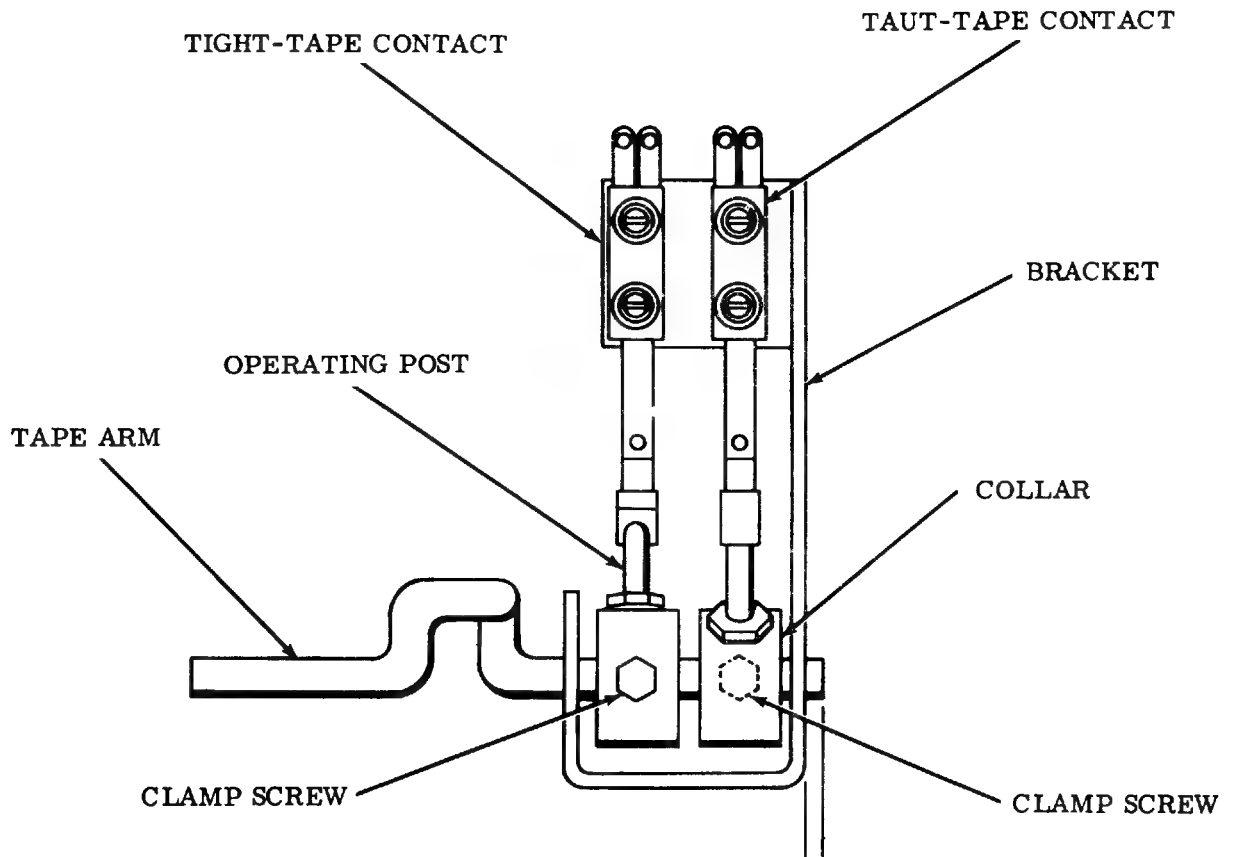
When taut-tape contact operating post is moved against insulator on swinger so that contacts transfer from their right (operated) to the left (unoperated) position, clearance should be

Min Some---Max 0.010 inch between contact operating post and its backstop.

To Adjust

With mounting screws loosened, position backstop to meet requirement.

3.07 Tape Control Mechanism (continued)

TAPE ARM**Requirement**

Tape arm should extend beyond the long formed section of the bracket by approximately 1/16 inch. Tape follower end of tape arm should be in line with center of bearing holes in bracket.

To Adjust

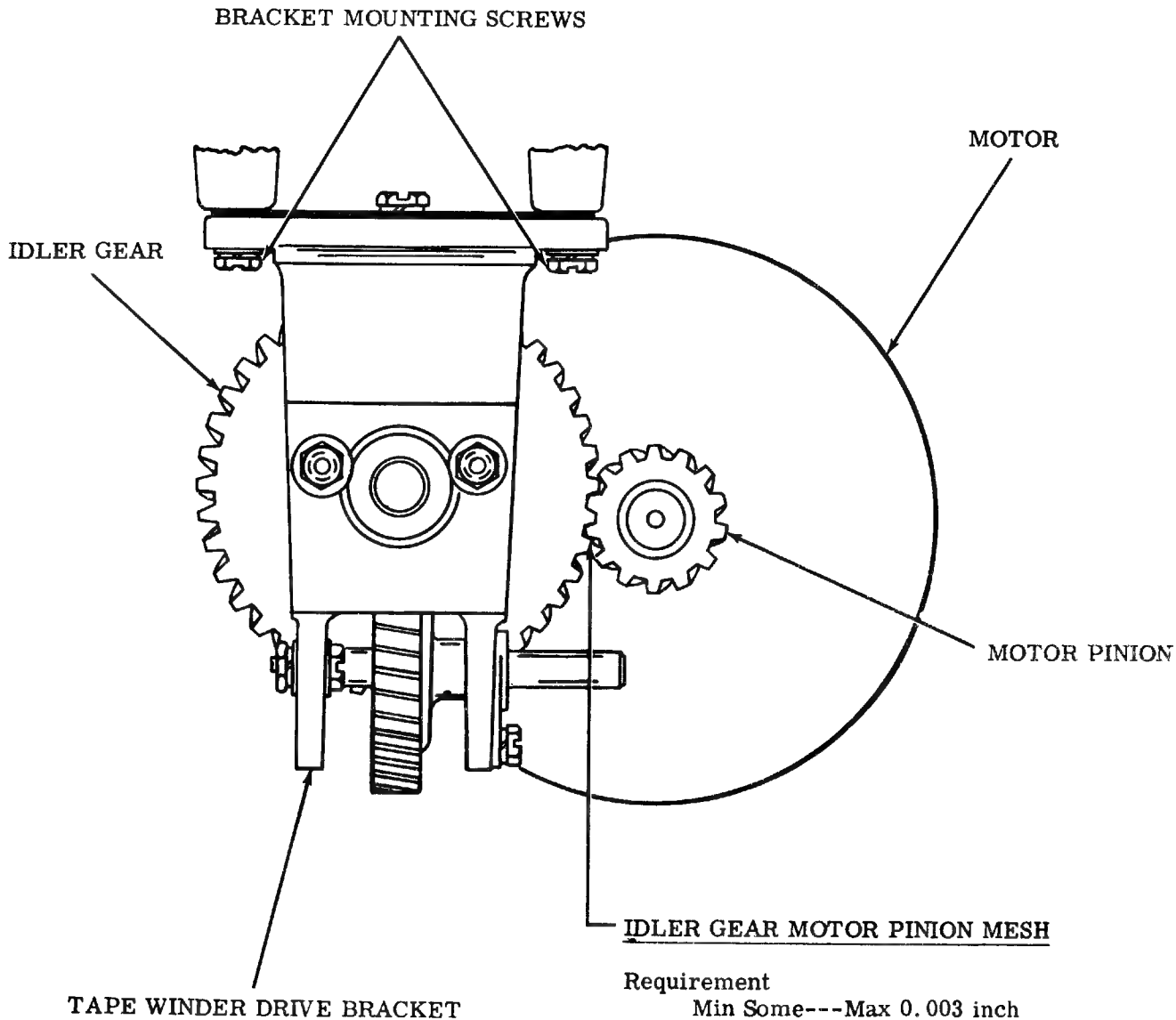
With contact operating post collar clamp screw loosened, hold taut-tape contact operating post against its backstop as far as it will go toward the long formed end of the bracket. Position tape arm to meet requirement. Tighten contact operating post collar clamp screw.

4. INTERRELATED ADJUSTMENTS

STANDARD SPEED REPERFORATOR TRANSMITTER SET

4.01 Motor to Tape Winder

Note: The adjustments in this paragraph cover the relationship between the transmitter distributor and the typing or nontyping reperforator.



Requirement

Min Some---Max 0.003 inch
between idler gear and motor pinion
throughout one revolution of idler gear.

To Adjust

Position tape winder drive bracket with
mounting screws loosened.

4.02 Transmitter Distributor to Reperforator

VERTICAL ALIGNMENT OF PIVOTED SENSING HEAD AND PUNCH

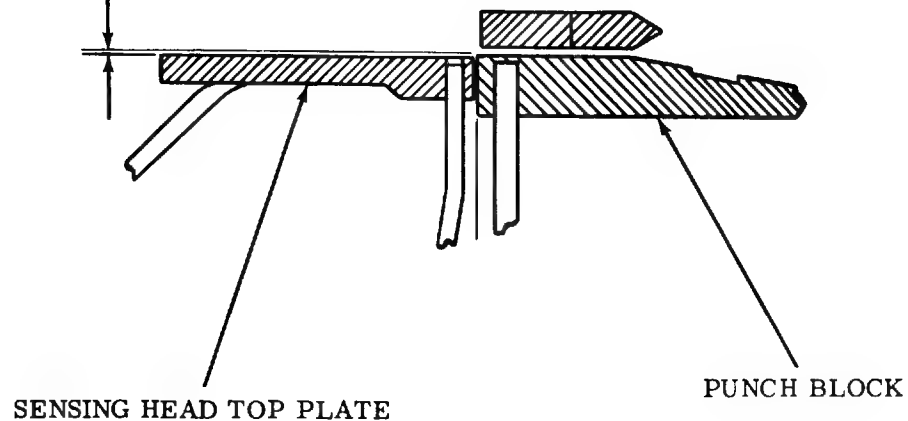
Requirement

With pivoted sensing head against punch block, top plate of sensing head should be

Min Flush---Max 0.010 inch
below bottom surface of tape slot in punch block.

To Adjust

Position height adjusting screw, on sensing end of unit, with locknut and mounting screw loosened.



4.03 Transmitter Distributor to Reperforator (continued)

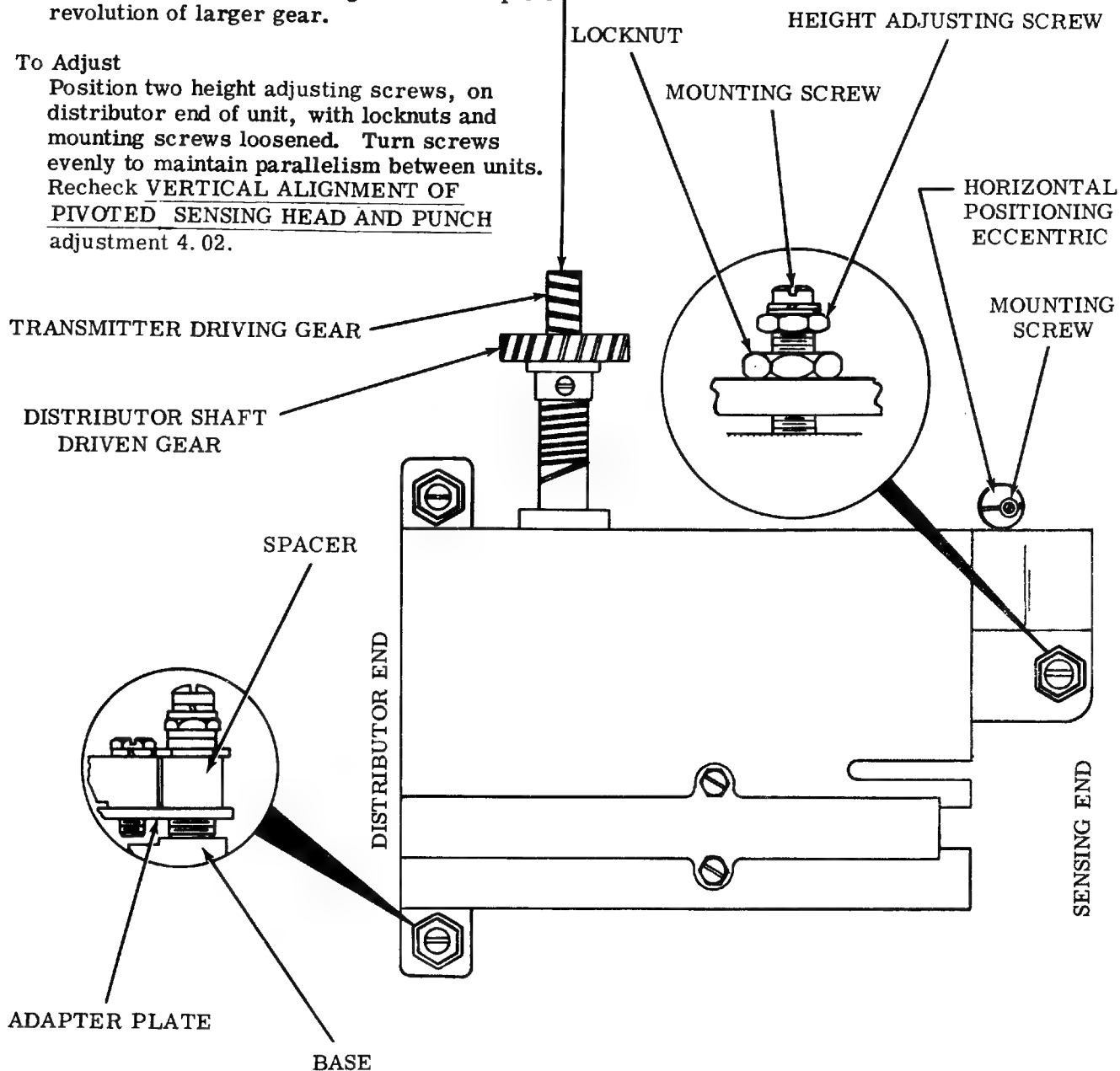
TRANSMITTER DRIVING AND DISTRIBUTOR
SHAFT DRIVEN GEAR MESH

Requirement

Min Some---Max 0.003 inch
backlash between distributor shaft driven
gear on transmitter and transmitter driving
gear on base. Check throughout one complete
revolution of larger gear.

To Adjust

Position two height adjusting screws, on
distributor end of unit, with locknuts and
mounting screws loosened. Turn screws
evenly to maintain parallelism between units.
Recheck VERTICAL ALIGNMENT OF
PIVOTED SENSING HEAD AND PUNCH
adjustment 4.02.



4.04 Transmitter Distributor to Reperforator (continued)

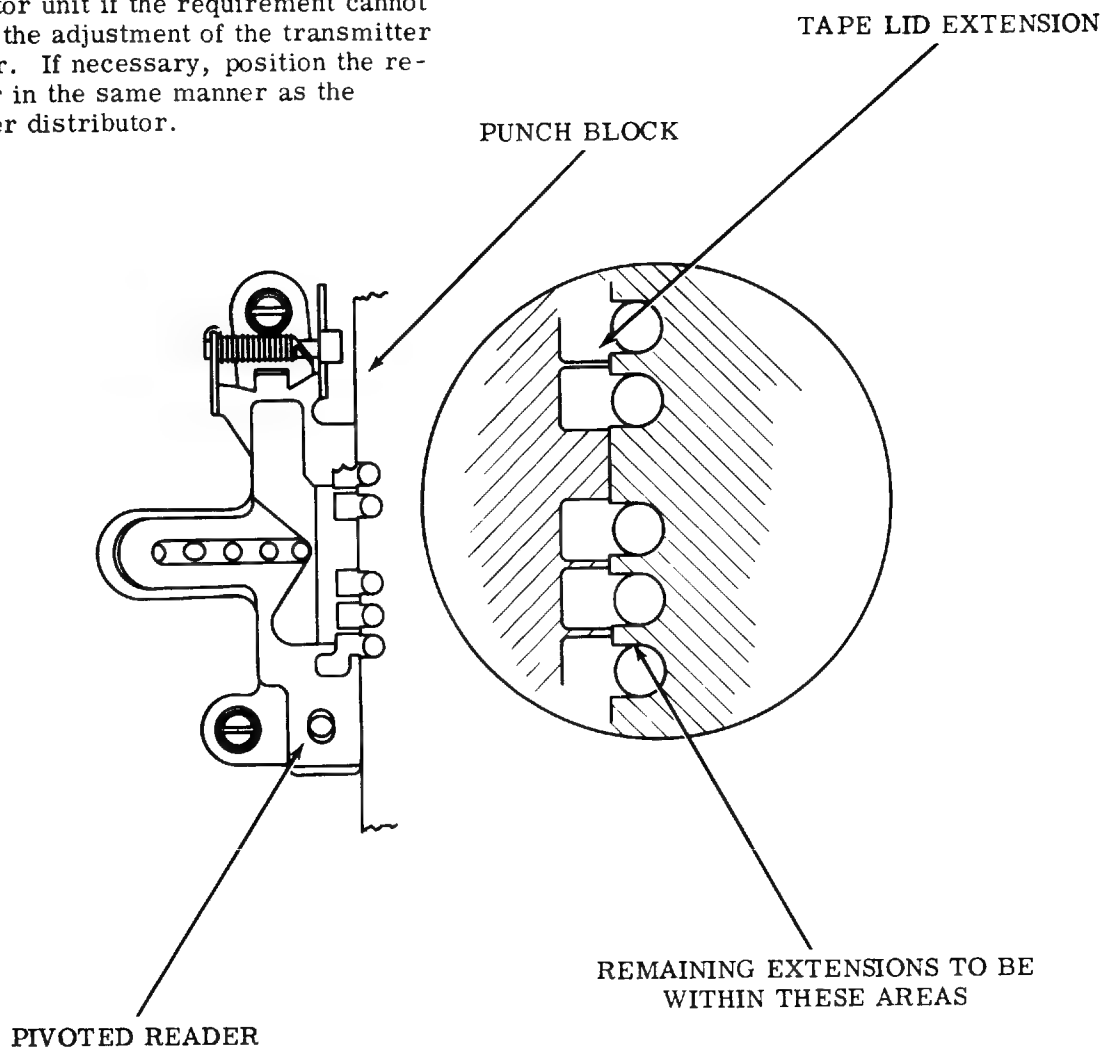
HORIZONTAL ALIGNMENT OF PIVOTED
SENSING HEAD AND PUNCH**Requirement**

When one tape lid extension is centered on respective area between punch pin slots, remaining extensions should be fully within their respective areas.

To Adjust

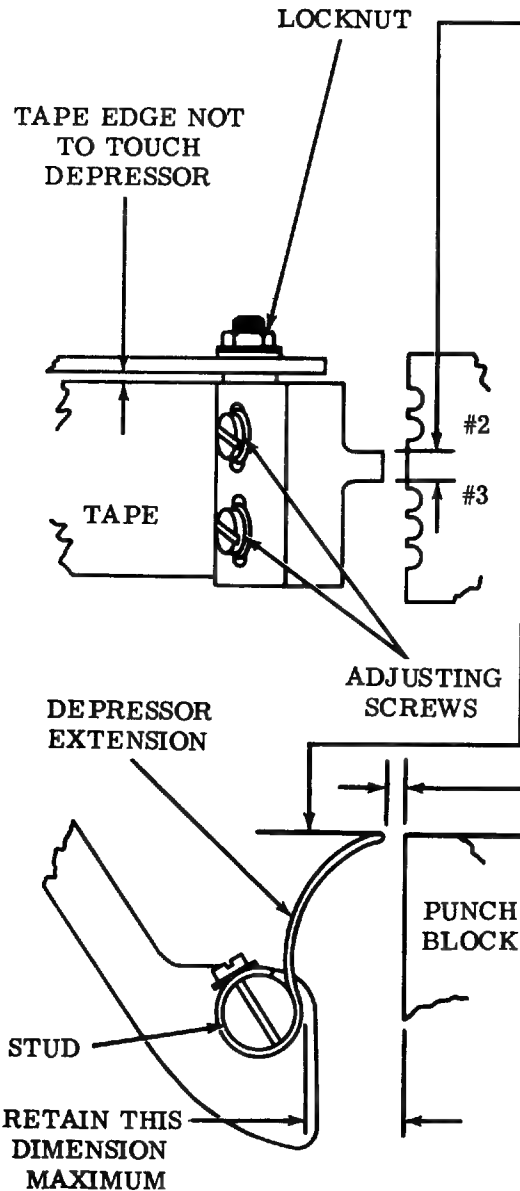
Loosen transmitter distributor and horizontal positioning eccentric mounting screws. Shift unit to meet requirement. Tighten unit mounting screws. Position eccentric against rear plate of transmitter distributor and tighten its mounting screw.

Note: It may be necessary to position the reperforator unit if the requirement cannot be met by the adjustment of the transmitter distributor. If necessary, position the reperforator in the same manner as the transmitter distributor.



4.05 Transmitter Distributor to Reperforator (continued)

TAPE DEPRESSOR



- (1) Requirement
Tip of depressor extension should be centered between #2 and #3 punch pin slots in punch block.

To Adjust
Position depressor extension with its two adjusting screws loosened.

- (2) Requirement
Depressor extension should be positioned
Min Flush---Max 0.060 inch
below top surface of punch block.

- (3) Requirement
Clearance between tape depressor extension and punch block
Min 0.040 inch---Max 0.080 inch

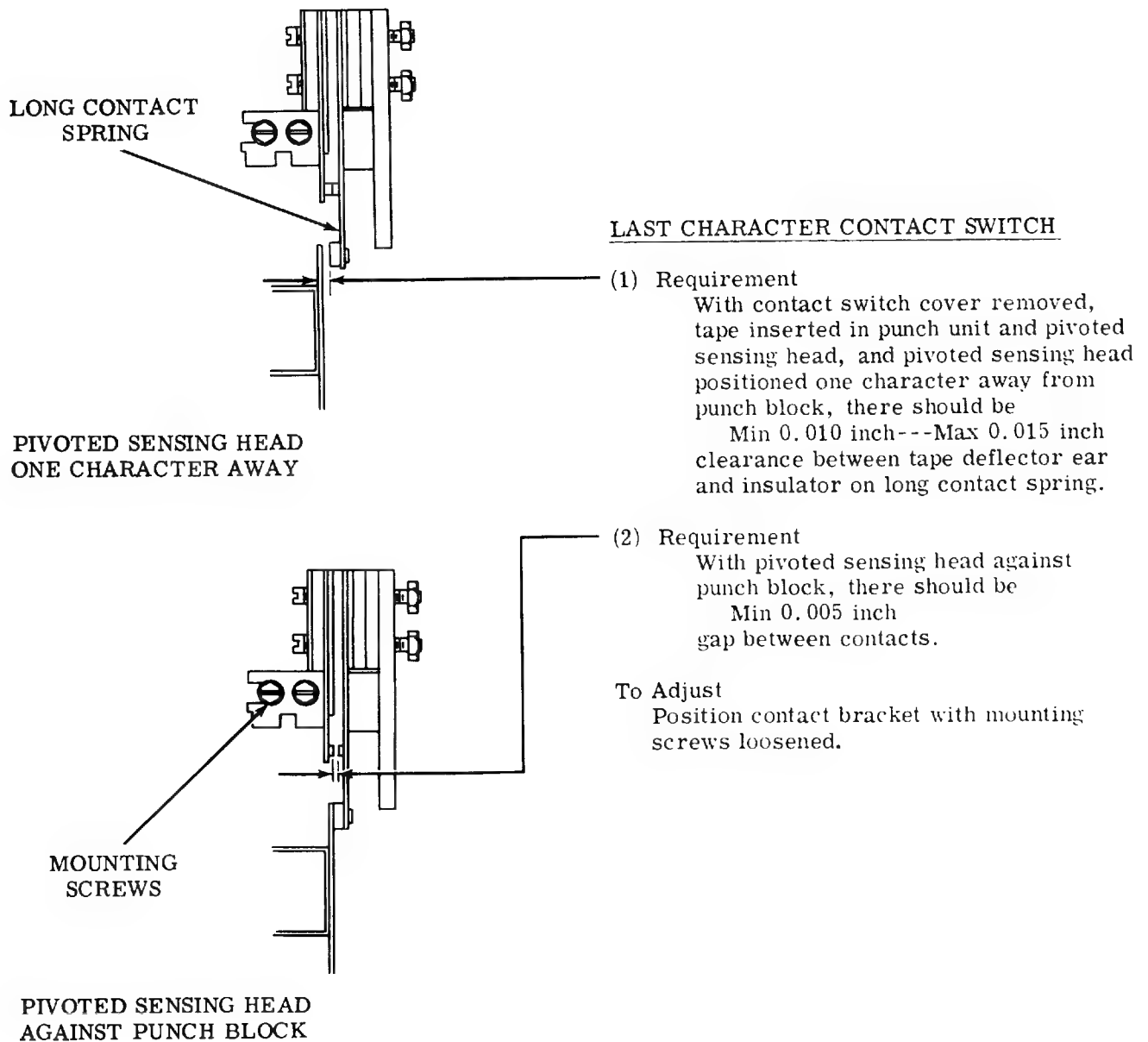
To Adjust
Position by moving tape depressor extension angularly and/or horizontally with locknut on depressor loosened.

Note: If requirement (2) is still not met, rotate bar at top of transmitter distributor (to which depressor bracket is secured) with four mounting screws of bar assembly loosened. Make sure clearance between punch block and depressor extension (at mounting stud) is maximum possible while still meeting requirement.

- (4) Requirement
With tape following normal path, and pivoted head approximately 15 characters from punch block, tape edge should not touch depressor.

To Adjust
Refine TAPE DEPRESSOR adjustment as prescribed in Section 573-127-700TC.

4.06 Transmitter Distributor to Reperforator (continued)



4.07 Tape Control Mechanism

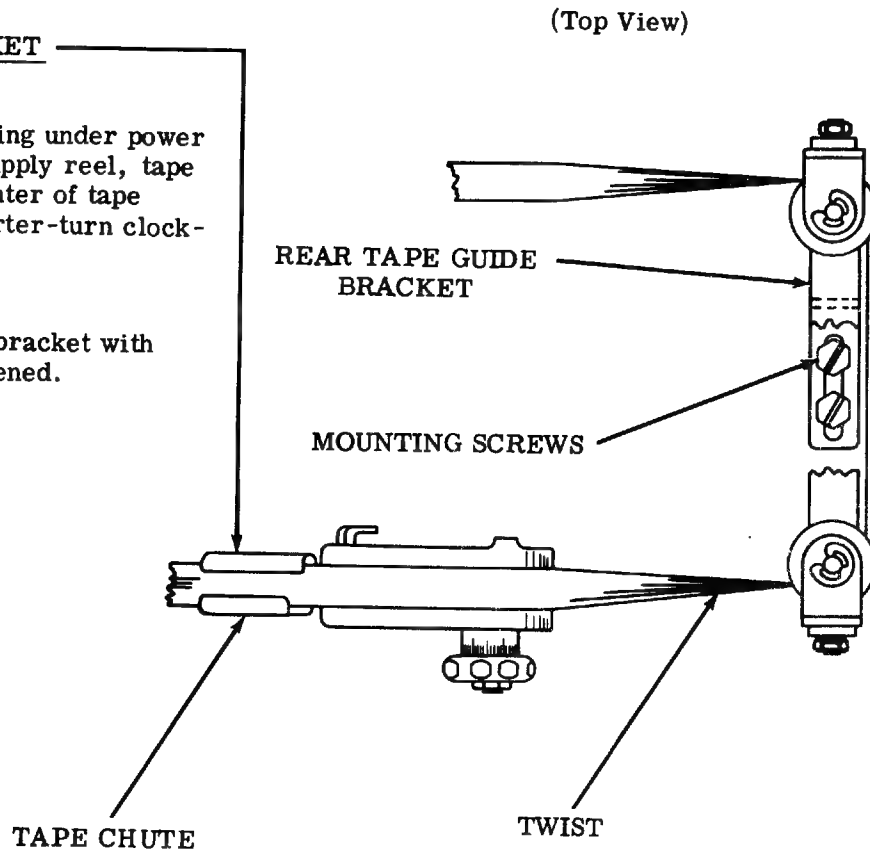
(A) REAR TAPE GUIDE BRACKET

Requirement

With reperforator operating under power and drawing tape from supply reel, tape should squarely enter center of tape chute (tape twisted a quarter-turn clockwise as it enters chute).

To Adjust

Position rear tape guide bracket with its mounting screws loosened.



(B) REAR TAPE GUIDE ROLLER

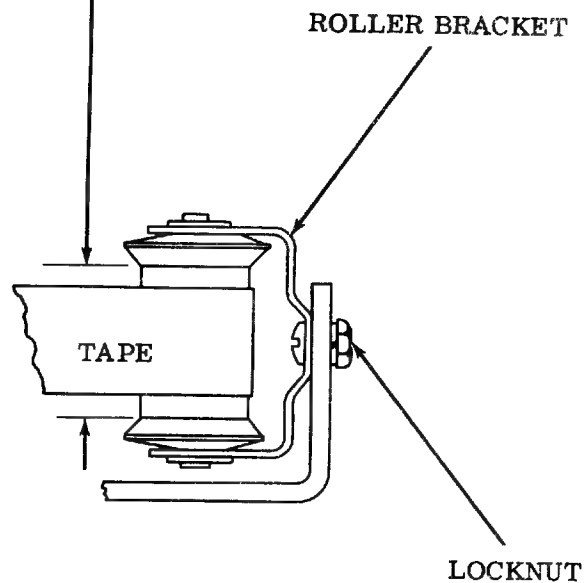
Requirement

Tape should ride approximately centered on tape rollers when reperforator is operating under power as in (A) REAR TAPE GUIDE BRACKET.

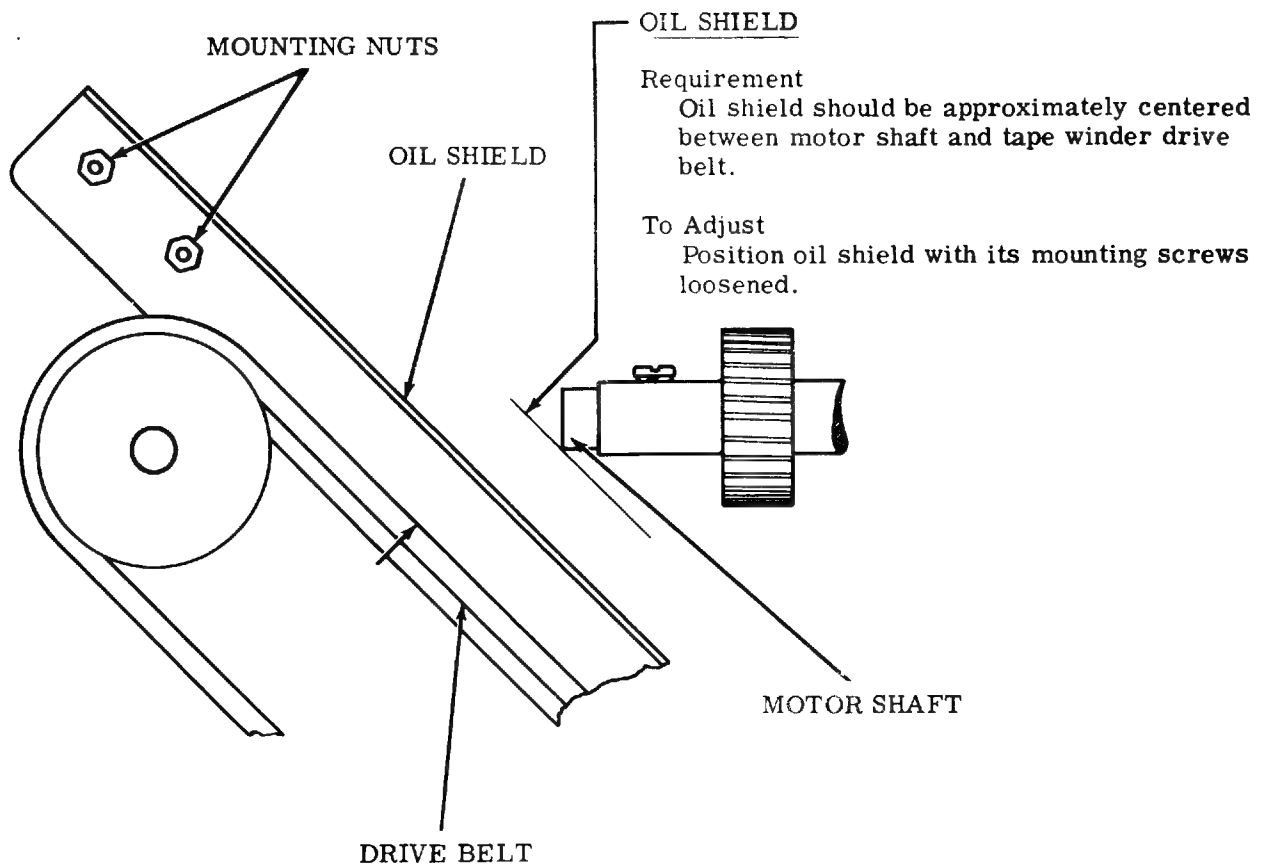
To Adjust

Loosen roller bracket locknut and position bracket while tape is in motion.

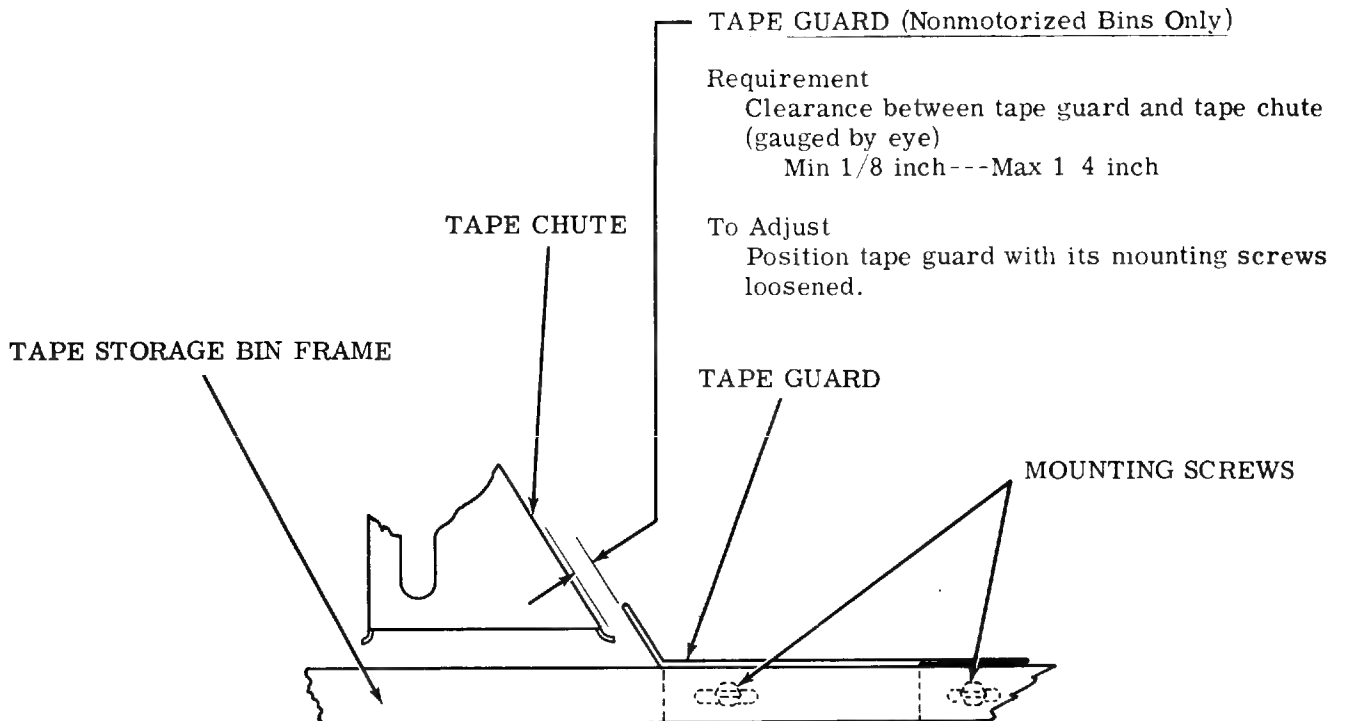
Note: Recheck REAR TAPE GUIDE BRACKET adjustment.



4.08 Tape Drive Mechanism



4.09 Tape Bin



4.10 Transmitter Distributor to Reperforator (continued)

Note: All preceding adjustments between transmitter distributor and typing or nontyping reperforator should be completed and requirements met before proceeding with following final adjustments.

CODE HOLE SENSING PIN ALIGNMENT

To Check

With a loop of letters tape (perforated under power by the reperforator) between reperforator and transmitter distributor, and pivoted sensing head resting against its backstop, manually trip sensing shaft clutch and rotate shaft until sensing pins are in their uppermost position.

(1) Requirement

The sensing pins should be approximately centered laterally on code holes.

To Adjust

Refine punch FEED HOLE LATERAL ALIGNMENT as prescribed in Section 573-118-700TC.

(2) Requirement

Sensing pins should be positioned toward rear edge of code hole.

Min 0.008 inch clearance between pin and rear edge. Check five places.

To Adjust

Check tape quality for compliance with TP156011 tape gauge and, if necessary, refine DETENT adjustment as prescribed in Section 573-118-700TC.

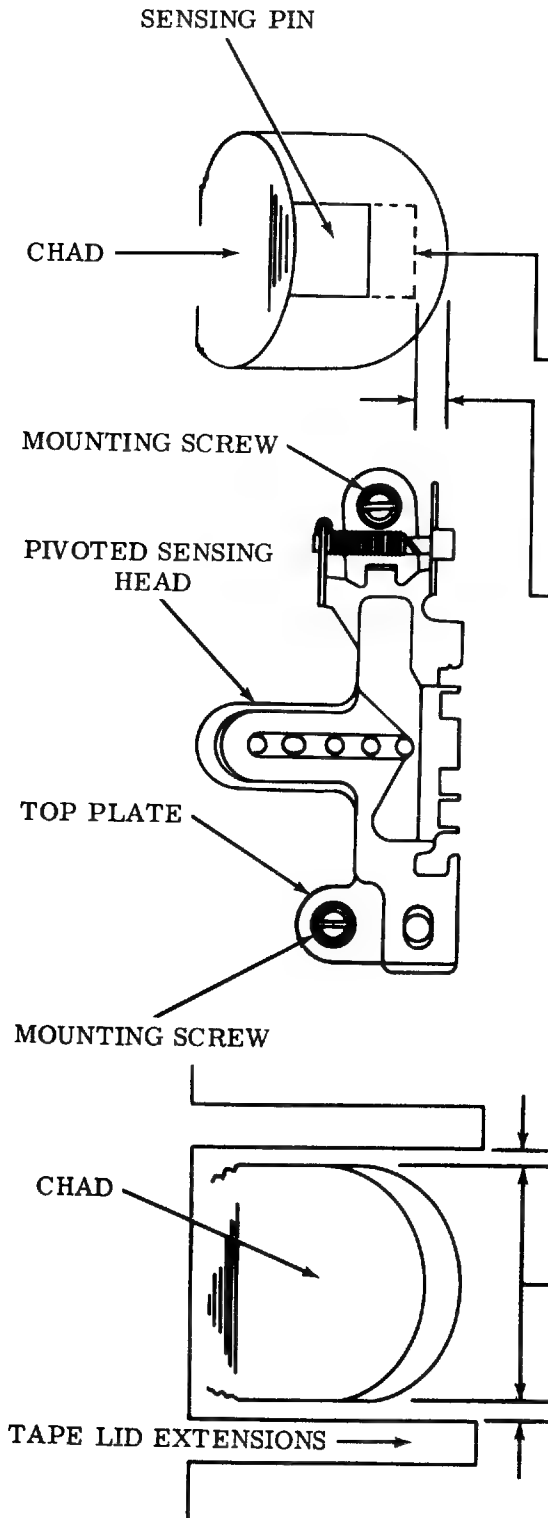
Note: If requirement still is not met, position pivoted sensing head top plate in required direction with its mounting screws loosened. Recheck LAST CHARACTER CONTACT SWITCH (4.06) adjustment.

(3) Requirement

As code holes are opened by sensing pins, there should be some clearance between sides of chad and tape lid extensions. Check ten places.

To Adjust

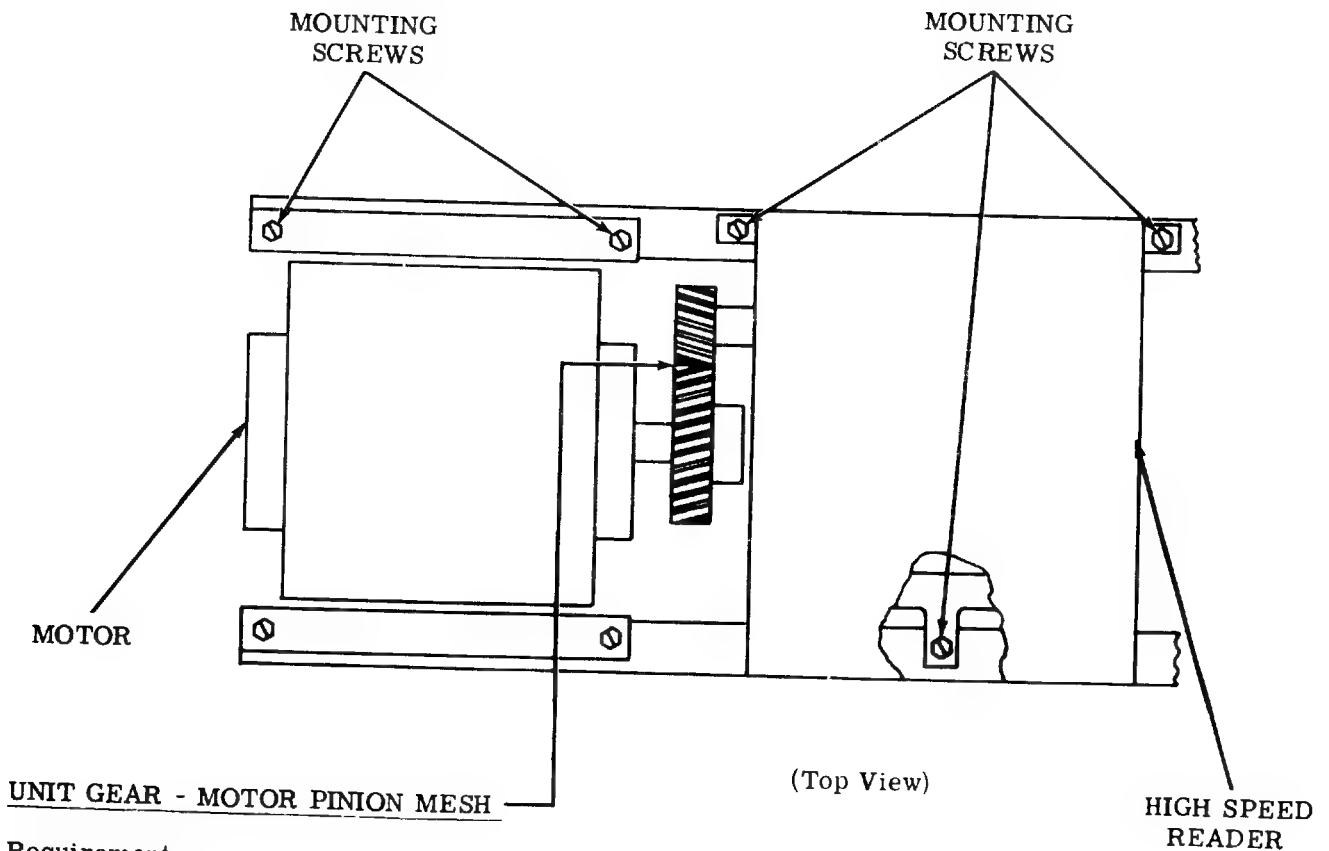
Position pivoted sensing head top plate laterally with its mounting screws loosened. Recheck requirement (2).



LOW TO HIGH SPEED REPERFORATOR TRANSMITTER SET

4.11 Motor to Transmitter Distributor

IDLER GEAR MOTOR PINION MESH - SEE 4.01



Requirement

Min Some---Max 0.003 inch
backlash between unit gear and motor pinion
throughout one revolution of unit gear.

To Adjust

Position high speed tape reader and its
motor with mounting screws loosened.

4.12 Transmitter Distributor to Reperforator

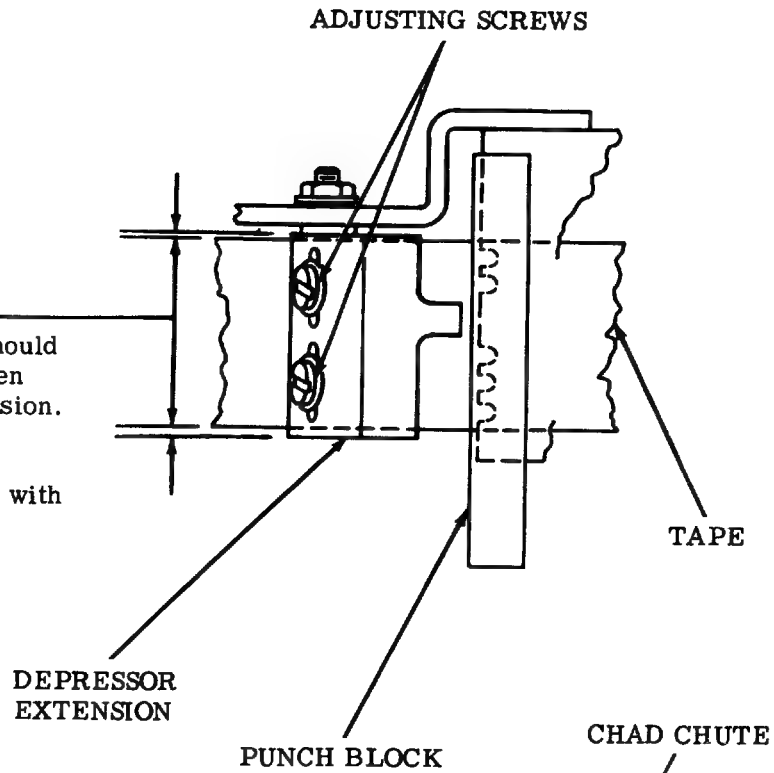
TAPE DEPRESSOR

(1) Requirement

With tape in punch block, there should be approximately 1/16 inch between edges of tape and depressor extension.

To Adjust

Position tape depressor extension with its adjusting screws loosened.



(2) Requirement

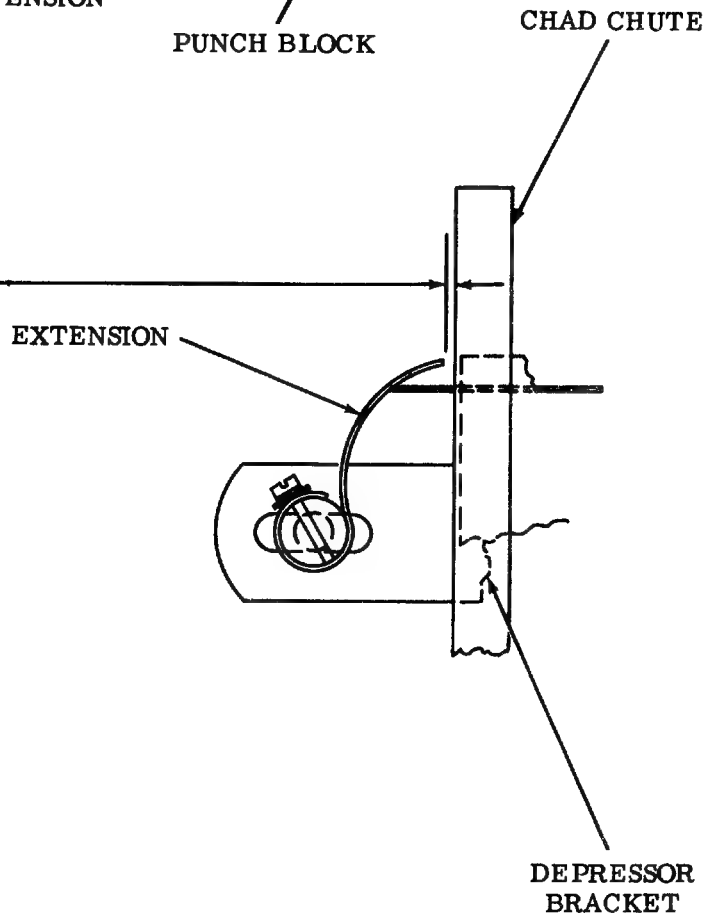
Min Some --- Max 0.040 inch clearance between tape depressor extension and chad chute.

(3) Requirement

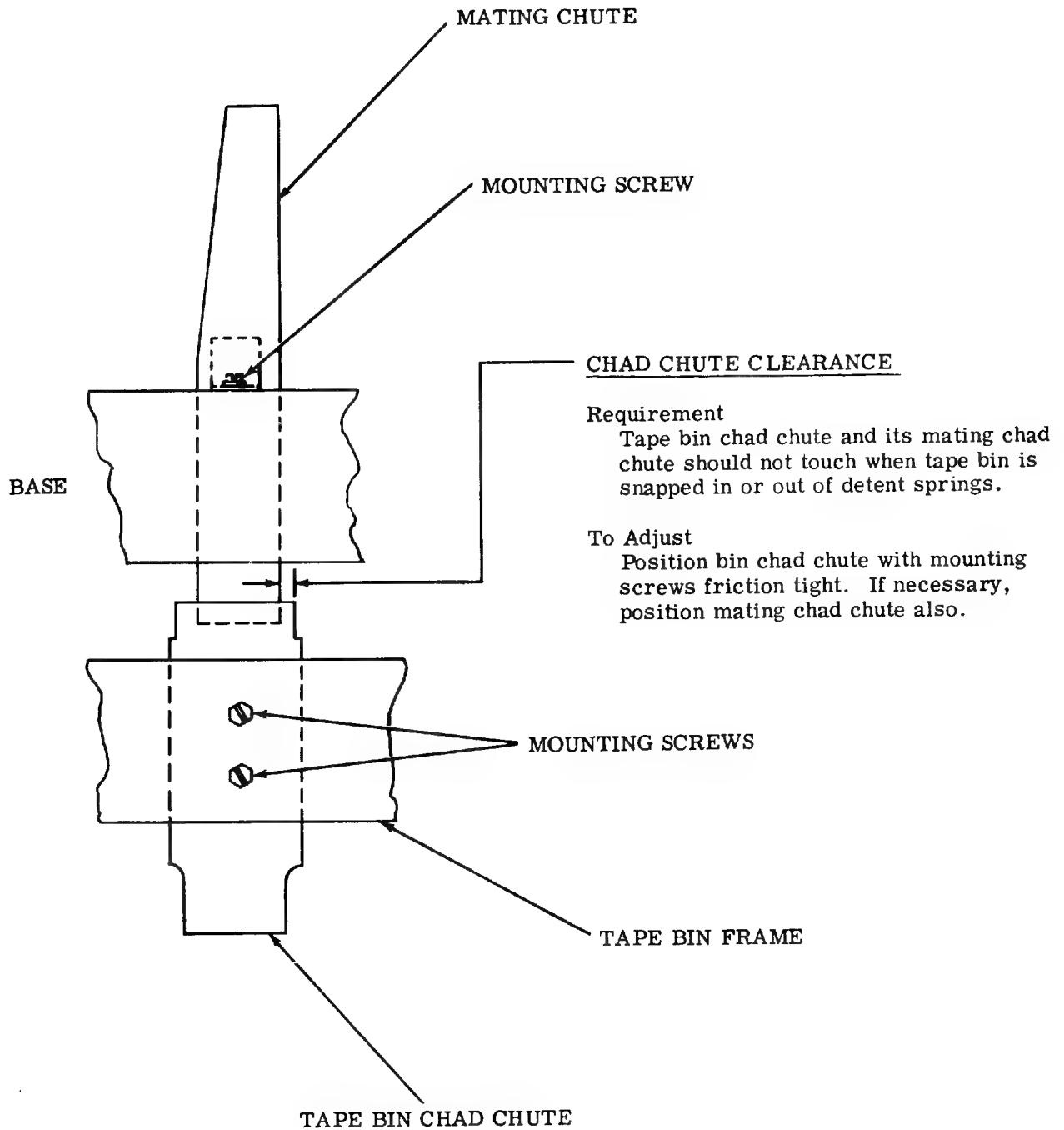
Shoulder of tape depressor extension should be above a piece of tape as the leading edge is fed straight out of the punch block.

To Adjust

Position tape depressor extension angularly and/or horizontally with its locknut loosened.



4.13 Tape Bin

REAR TAPE GUIDE BRACKET - SEE 4.07REAR TAPE GUIDE ROLLER - SEE 4.07

HIGH TO LOW SPEED REPERFORATOR TRANSMITTER SET

4.14 Sprocket to Motor

IDLER GEAR MOTOR PINION MESH - SEE 4.01

MOTOR SPROCKET CLEARANCE

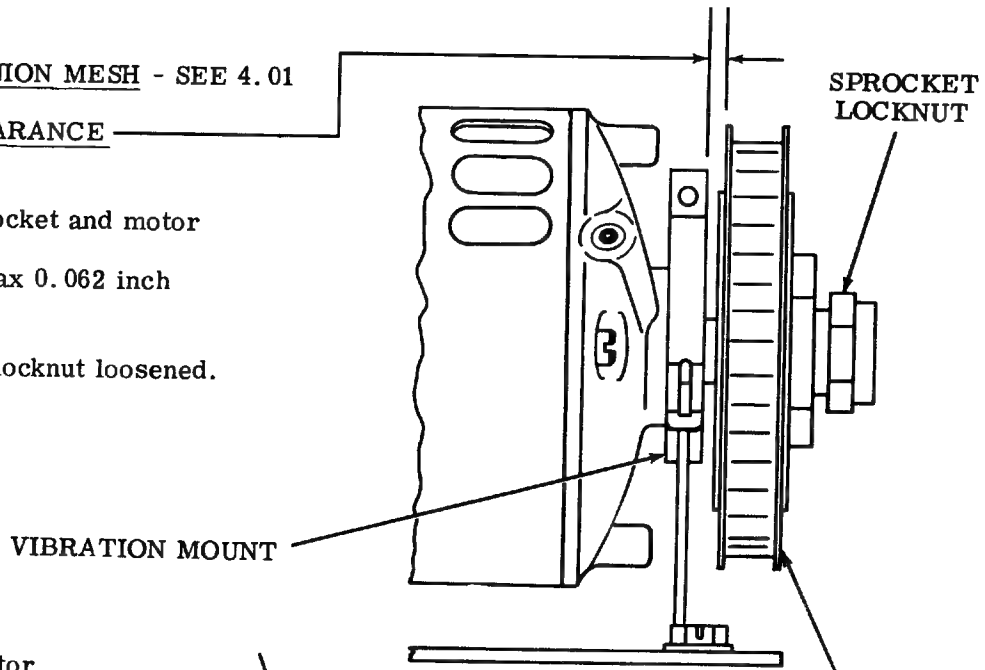
Requirement

Clearance between sprocket and motor vibration mount

Min 0.031 inch---Max 0.062 inch

To Adjust

Position sprocket with locknut loosened.



(Left Side View)

4.15 Motor to Reperforator

TIMING BELT

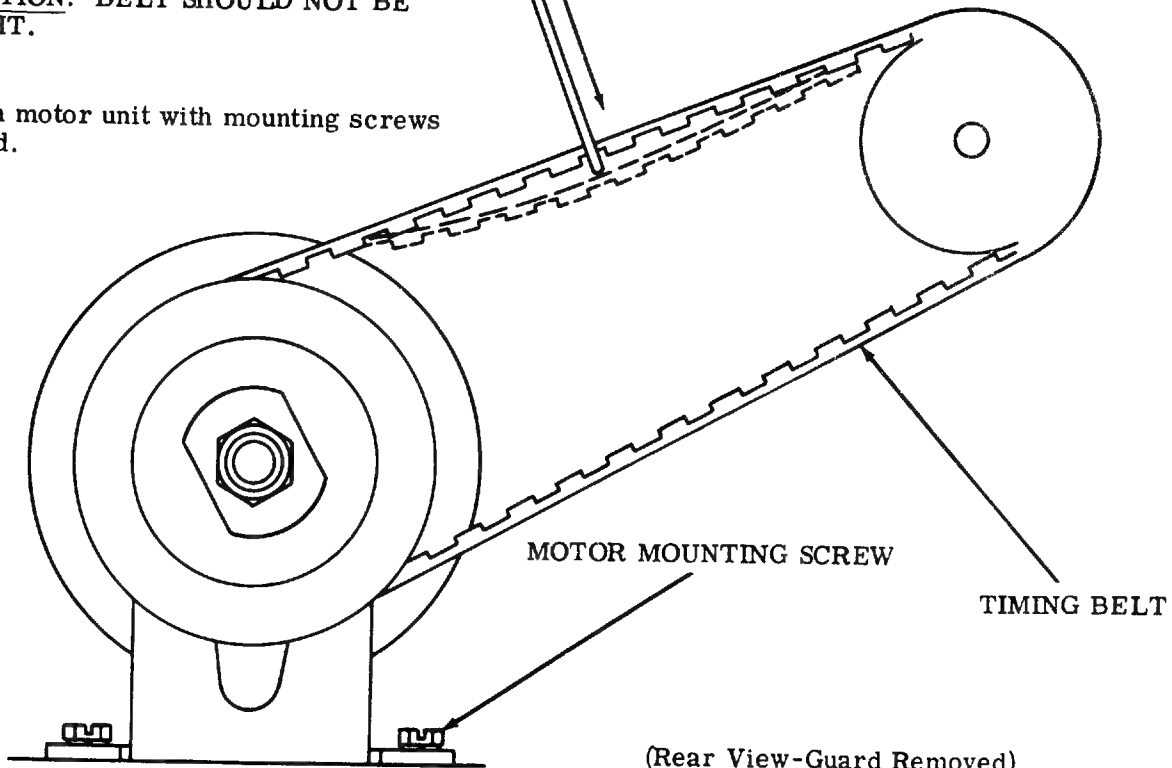
Requirement

A 5 ounce pressure at center of span should deflect belt 0.250 inches.

CAUTION: BELT SHOULD NOT BE TIGHT.

To Adjust

Position motor unit with mounting screws loosened.



4.16 Sprocket to Reperforator

(A) SPROCKET CLEARANCE**Requirement**

Clearance between threaded shoulder on drive shaft and sprocket
Min Same---Max 0.031 inches

To Adjust

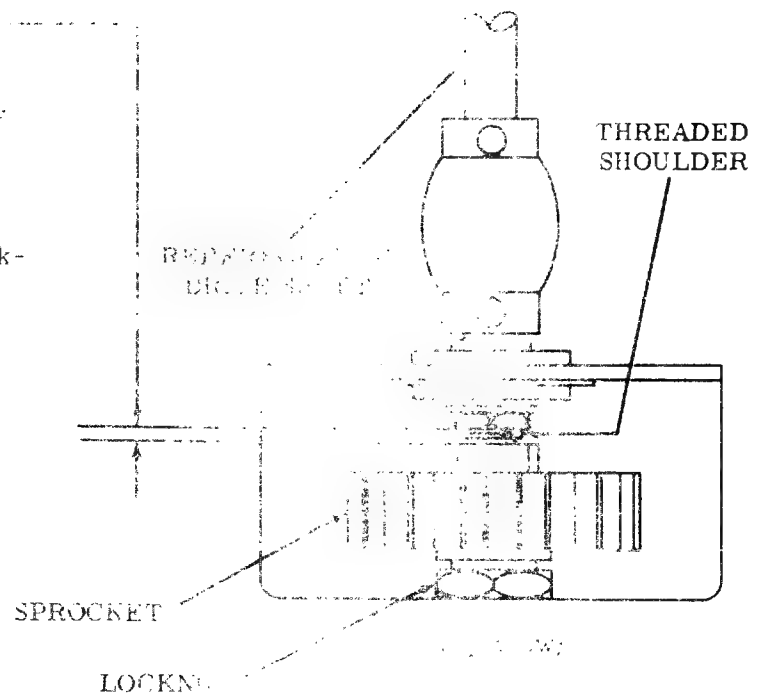
Position sprocket with sprocket lock-nut loosened.

(B) DRIVE SHAFT ALIGNMENT**Requirement**

Reperforator drive shaft should be in line with sprocket drive shaft on opposite side of rubber coupling.

To Adjust

Position bearing bracket with its three mounting screws loosened. (gauge by eye from top of unit).



4.17 Tape Control Mechanism

TIGHT TAPING AND EMERGENCY CONTACT GAP**To Check**

Thread length of perforated tape between transmitter distributor and reperforator. Place transmitter distributor in free wheeling position and manually draw tape through lead until tight-tape arm begins to lift.

(1) **Requirement**

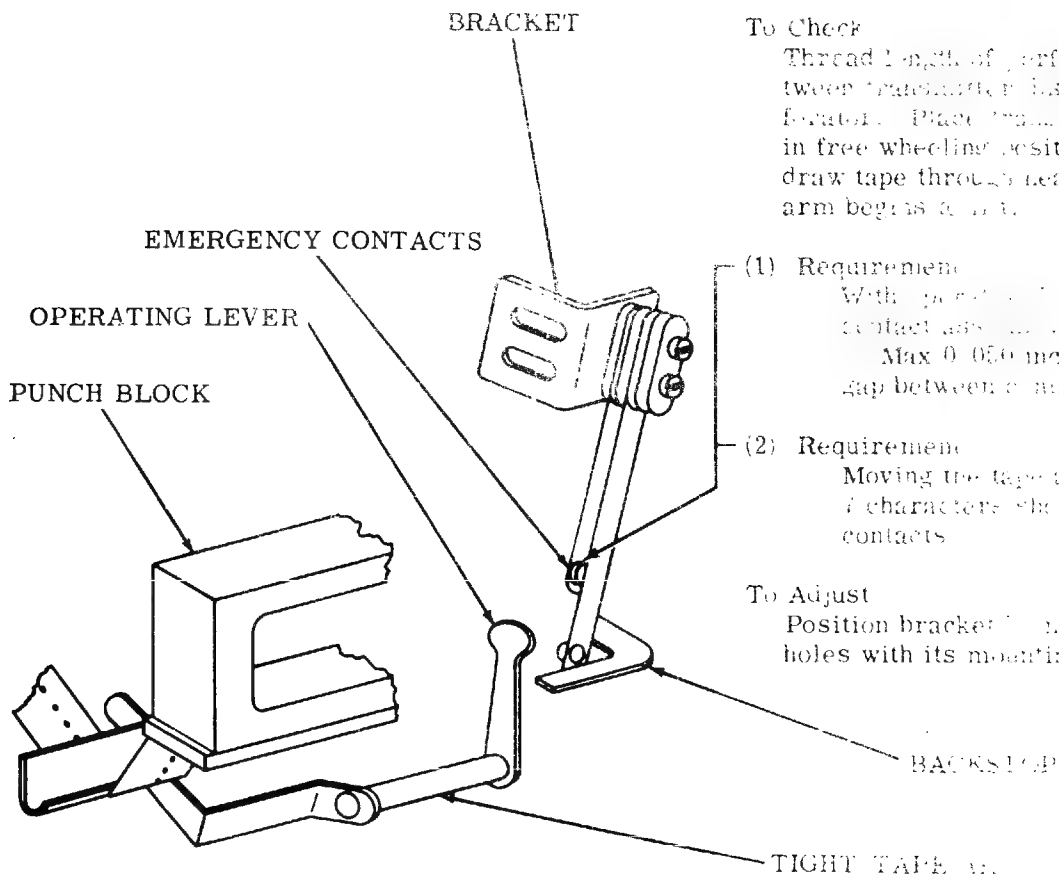
With tape arm forced against contact arm, no backstop
Max 0.050 inch gap between contacts

(2) **Requirement**

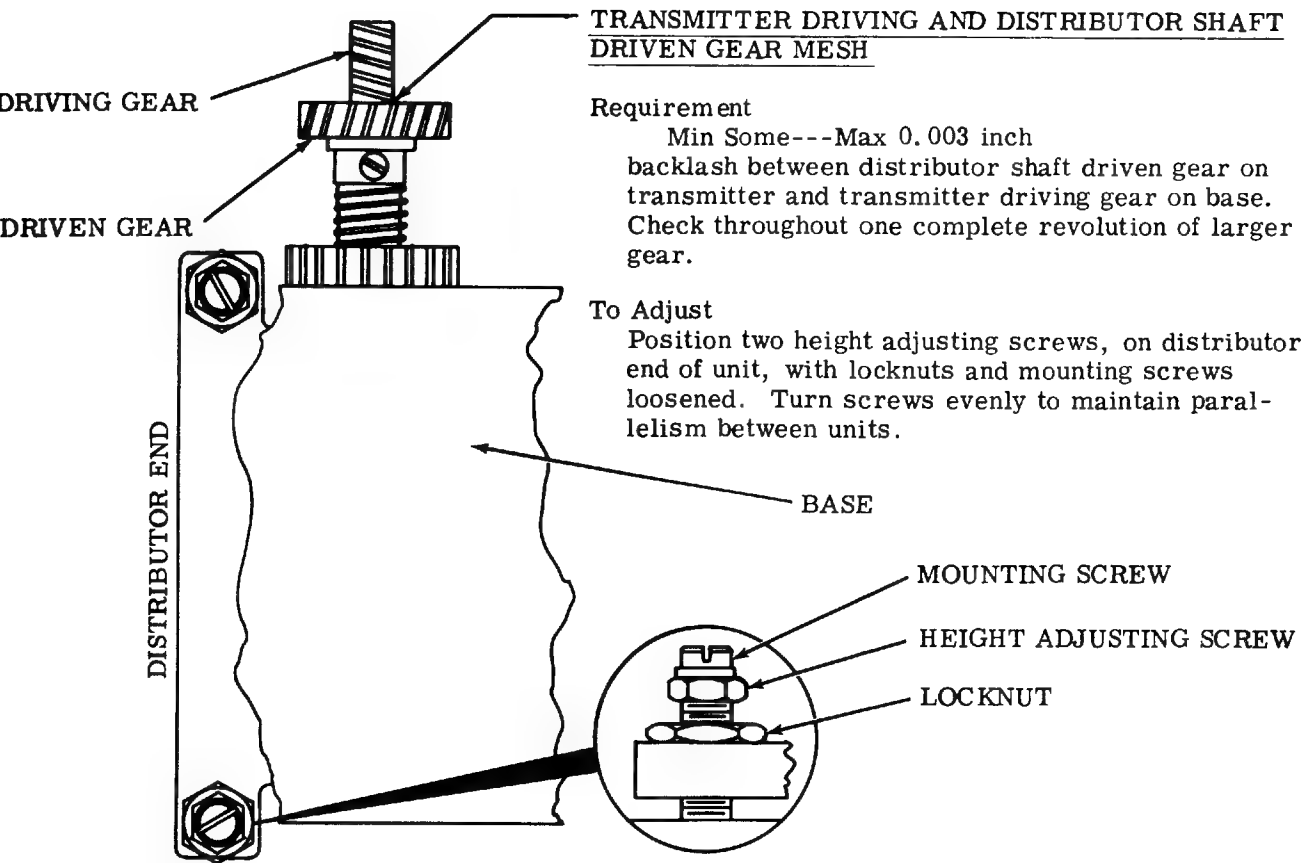
Moving the tape an additional 5 or 7 characters should just separate contacts

To Adjust

Position bracket by moving it in slotted holes with its mounting screws loosened.



4.18 Tape Drive Mechanism

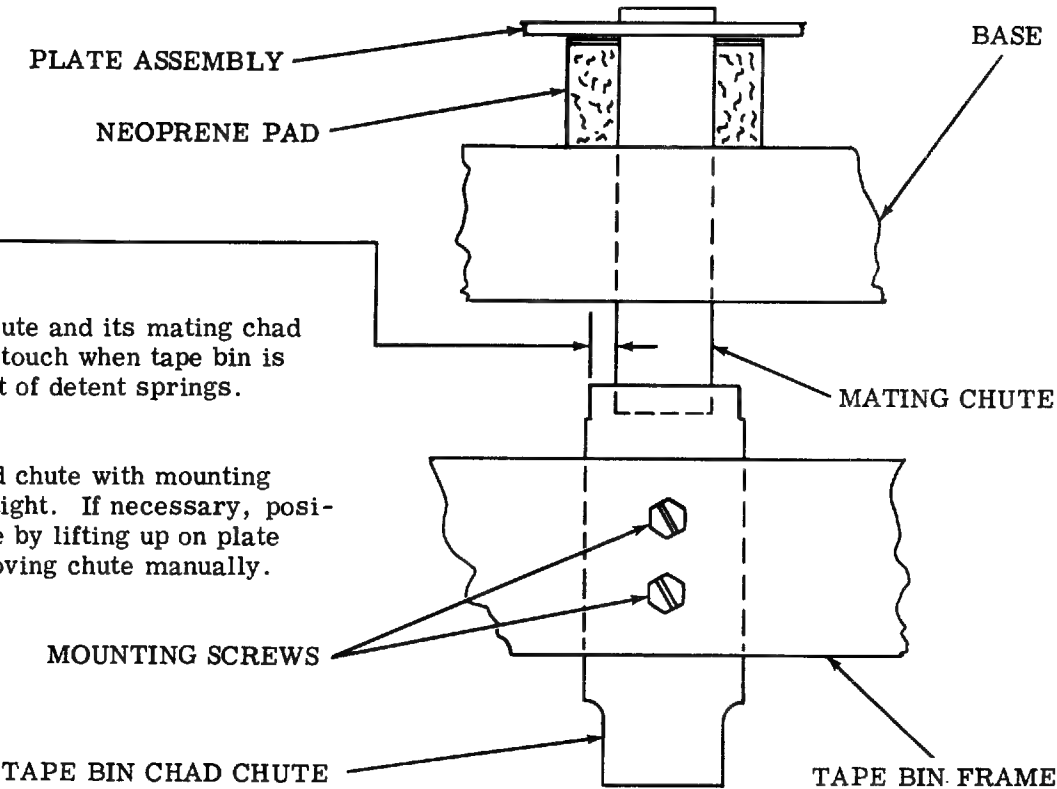


4.19 Tape Bin

CHAD CHUTE

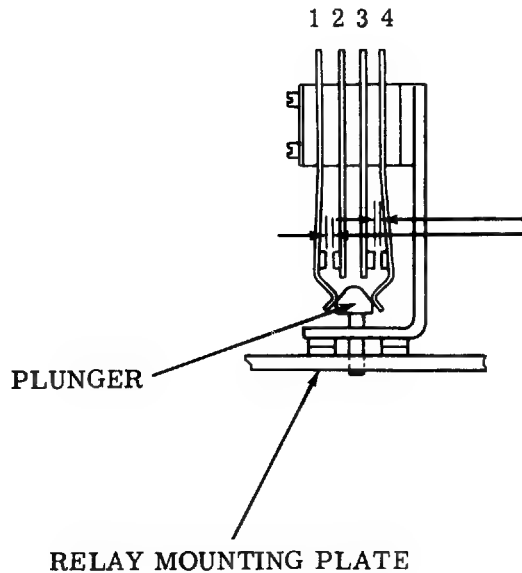
Requirement
Tape bin chad chute and its mating chad chute should not touch when tape bin is snapped in or out of detent springs.

To Adjust
Position bin chad chute with mounting screws friction tight. If necessary, position mating chute by lifting up on plate assembly and moving chute manually.



4.20 Cabinet to Tape Handling Stand

CONTACT SPRINGS

LINE SHUNT CONTACTS

Requirement

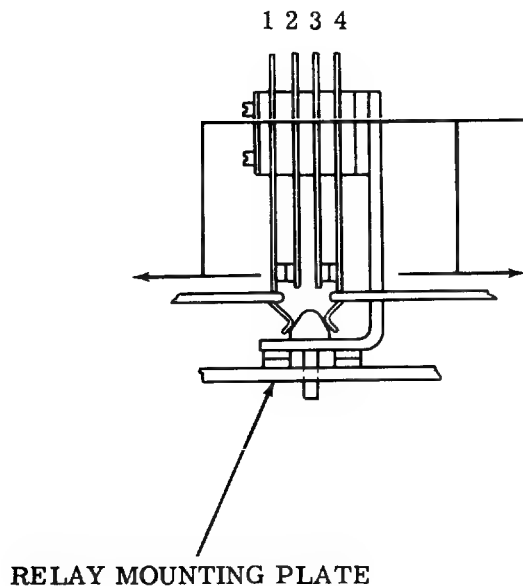
With bakelite plunger held flush with relay mounting plate, there should be a gap between the #1 and #2 contacts and between the #3 and #4 contacts.

Min 0.010 inch---Max 0.015 inch

To Adjust

Bend the #2 and #3 contact springs.

CONTACT SPRINGS

LINE SHUNT CONTACTS SPRING

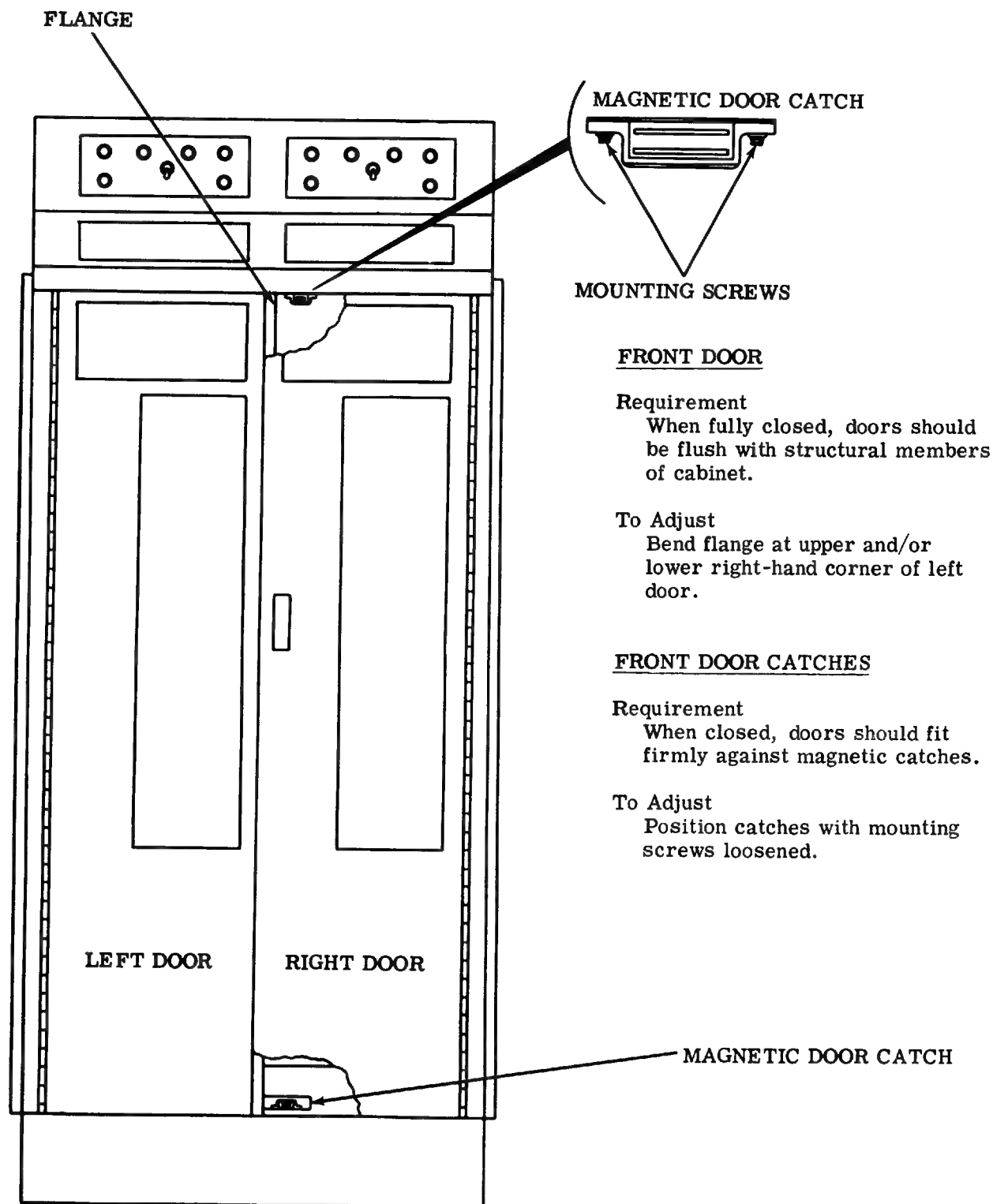
Requirement

Min 5 oz---Max 7 oz
to separate contacts.

To Adjust

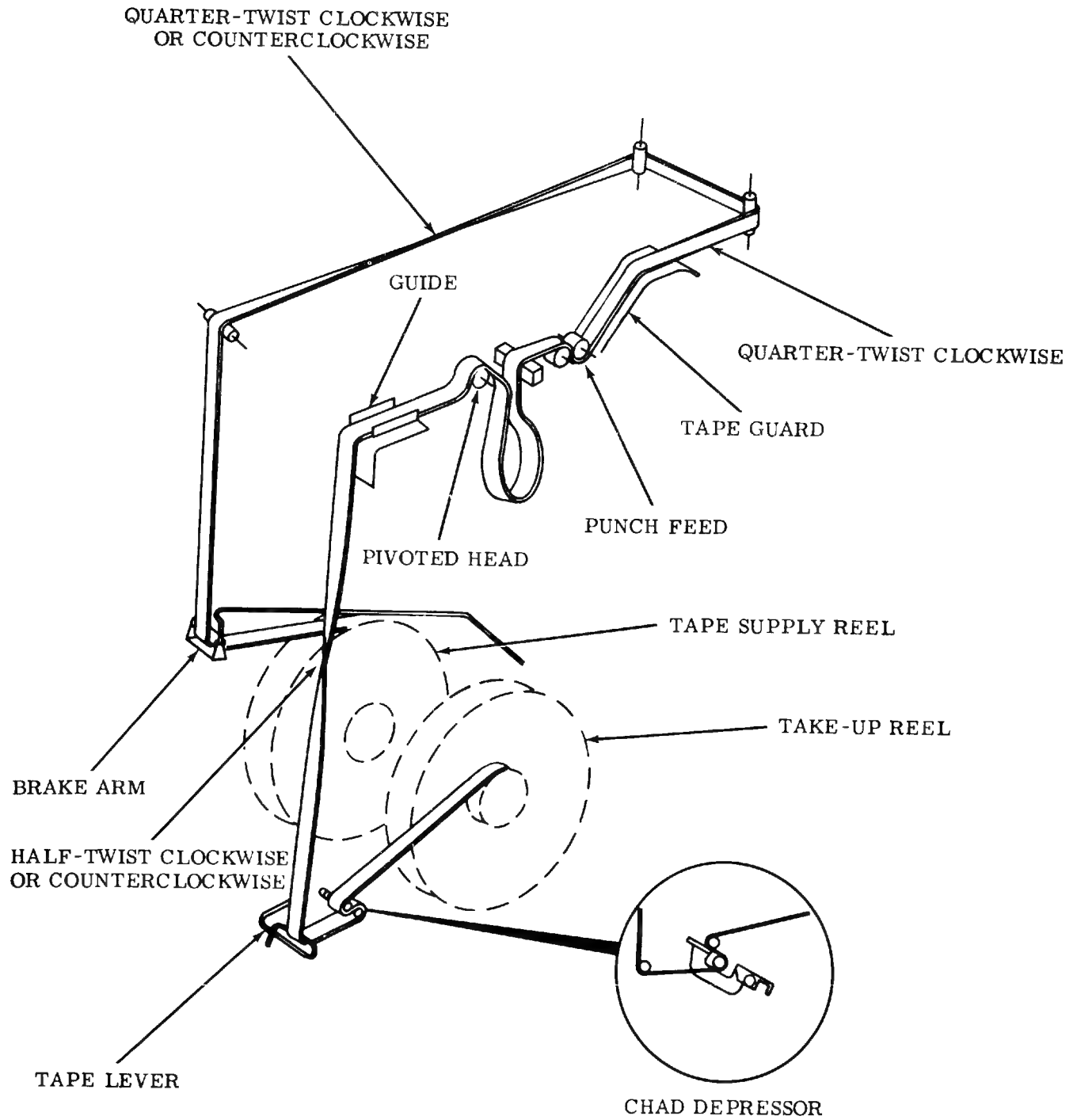
Bend #1 and #4 contact springs.

4.21 Cabinet Door Latch

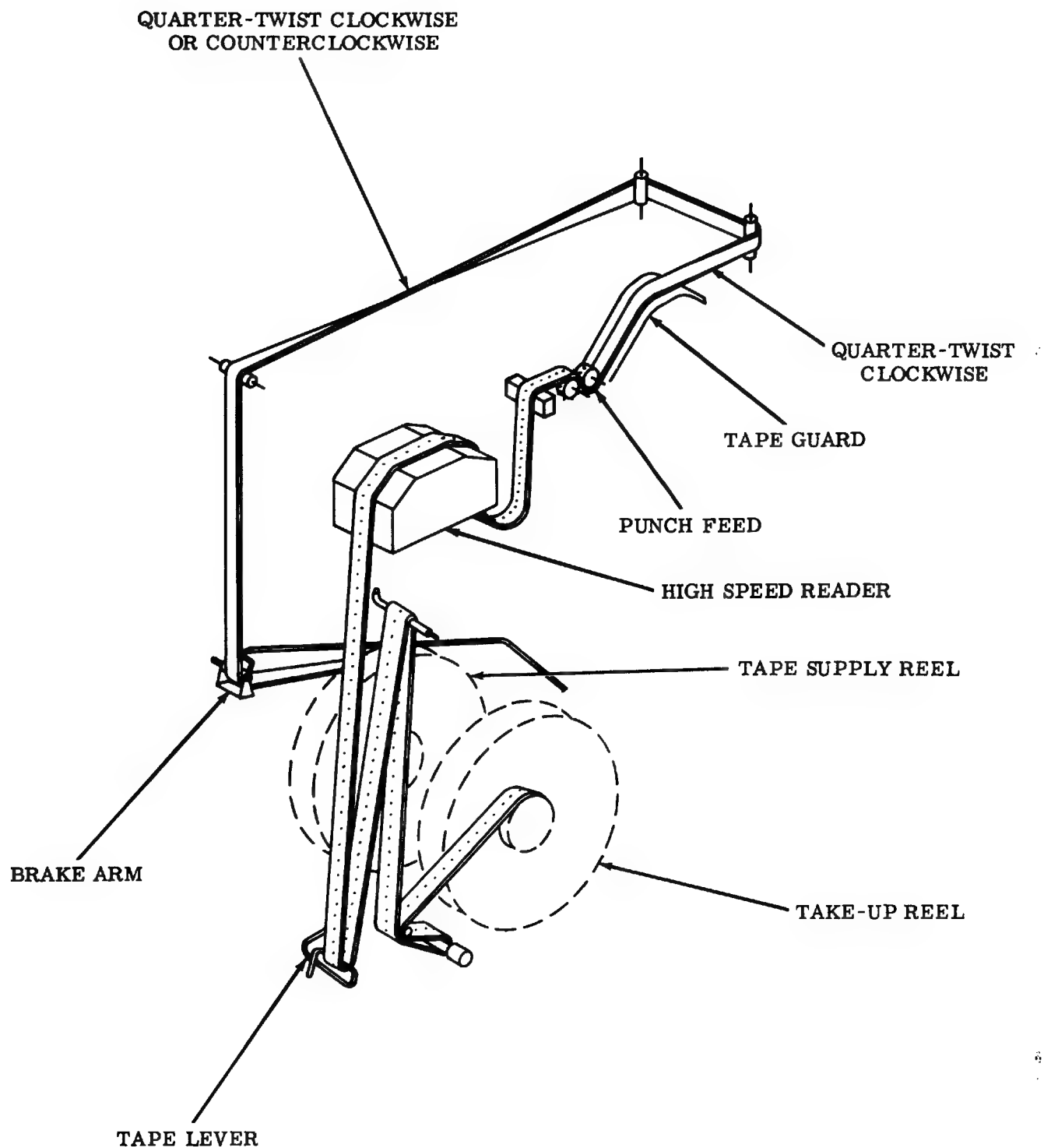


5. TAPE ROUTING

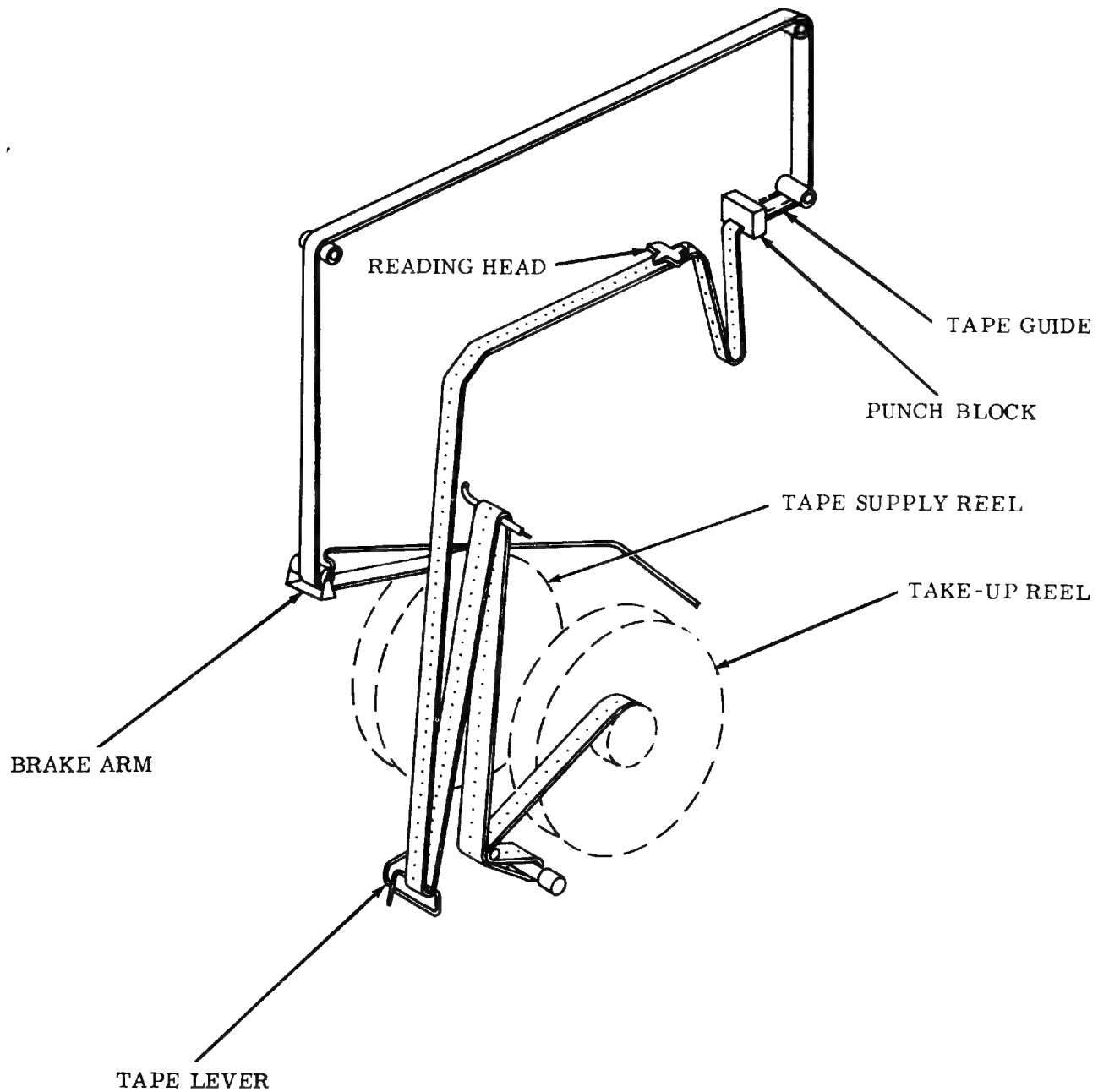
5.01 Standard Speed Reperforator Transmitter Set



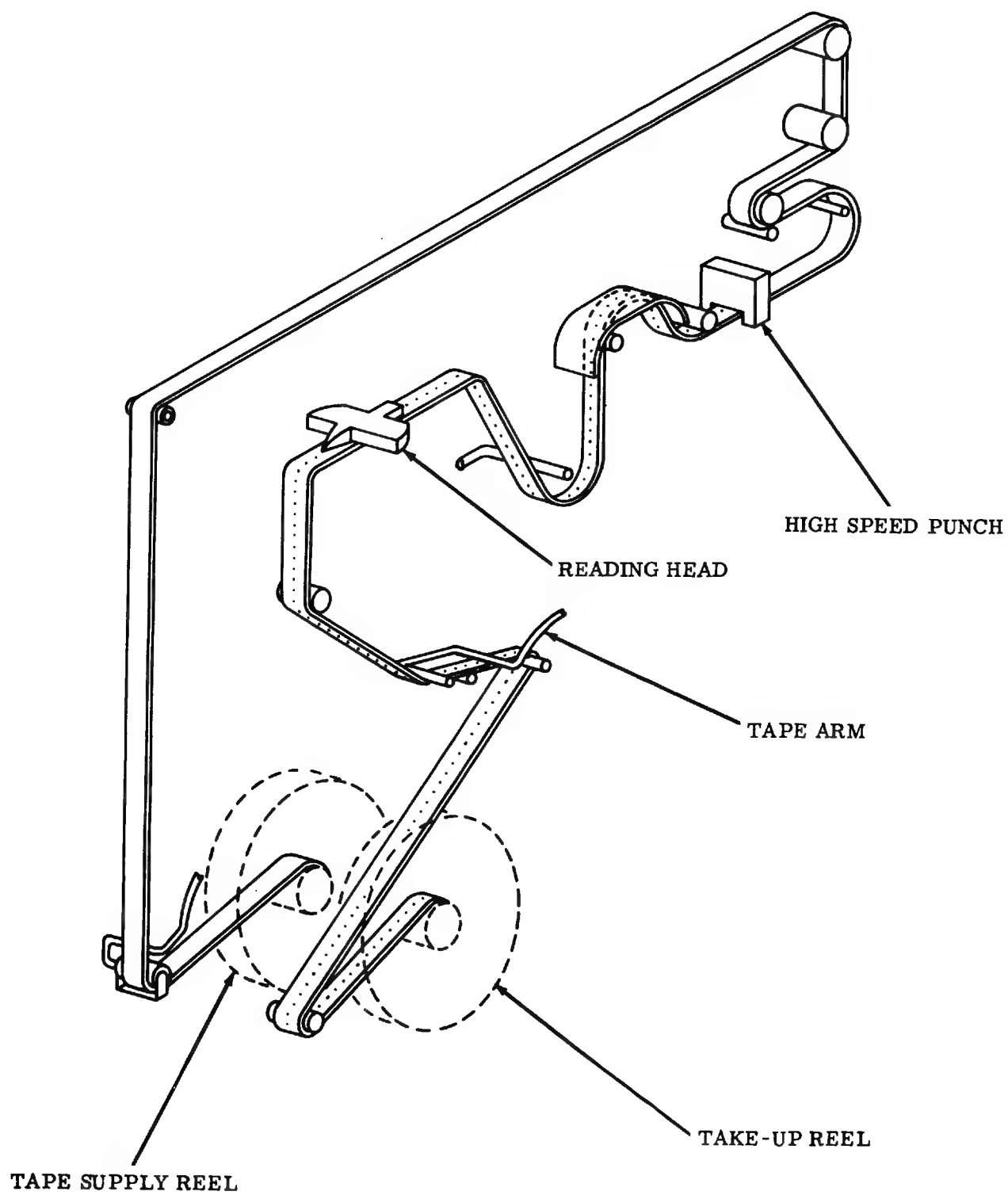
5.02 Low to High Speed Reperforator Transmitter Set



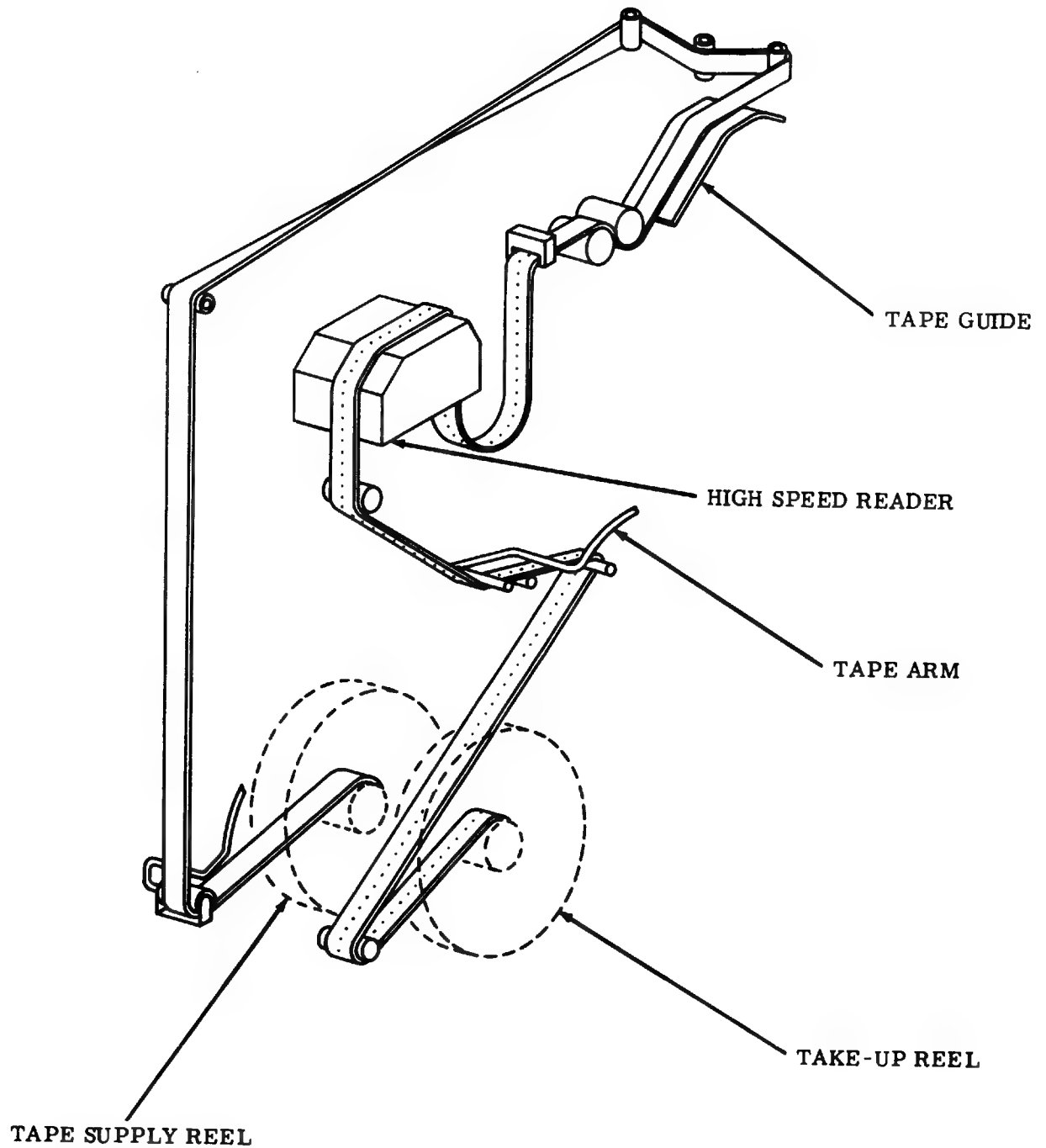
5.03 High to Low Speed Reperforator Transmitter Set



5.04 High to Low Speed Reperforator Transmitter Set (V Belt Drive)



5.05 Low to High Speed Reperforator Transmitter Set (V Belt Drive)



28 TAPE HANDLING STAND (LTHS) AND
REPERFORATOR TRANSMITTER BASE (LRXB)

LUBRICATION

CONTENTS	PAGE	1. GENERAL
1. GENERAL	1	1.01 The tape handling stand and reperforator transmitter base should be lubricated as directed in this section. The figures indicate points to be lubricated and the kind and quantity of lubricant to be used. Lubricate the tape handling stand and reperforator transmitter base prior to storing or placing it in service. After a few weeks in service relubricate to make certain that all points receive lubrication. Thereafter, the following schedule should be followed:
2. TAPE HANDLING STANDS	3	
Clutch shaft and intermediate gear assembly	3	
Drive shaft assembly	3	
Stop lever and tape arm mechanism	3	
Tape alarm mechanism	3	
3. TAPE HANDLING STAND (HIGH SPEED ONLY).	4	<u>Operating Speed (WPM)</u> <u>Lubrication Interval</u>
Drive shaft assembly	4	60 3000 hr or 1 yr*
Oil reservoir	4	75 2400 hr or 9 mo*
Reel drive shaft assembly	4	100 1500 hr or 6 mo*
Tape alarm mechanism	4	1000 150 hr or 1 mo*
Tape winder reel assembly	4	*Whichever occurs first.
4. TAPE HANDLING STAND (V BELT DRIVE)	5	1.02 Use KS7470 oil at all locations where the use of oil is indicated. Use KS7471 grease on all surfaces where grease is indicated.
Lower pulley assembly	6	1.03 All spring wicks and felt oilers should be thoroughly lubricated. However, over-lubrication, which will permit oil or grease to drip or be thrown on other parts, should be avoided.
Supply reel	7	
Take-up reel	5	
Tape arm bail	7	
Tape arm latch	6	
Upper pulley assembly	5	
5. REPERFORATOR TRANSMITTER BASE	8	CAUTION: DO NOT LUBRICATE THE TAPE WINDER REEL DRIVE GEAR OR PINION, OR THE TAPE WINDER AND TAPE SUPPLY REEL SHAFT BEARINGS ON THE TAPE HANDLING STAND. DO NOT LUBRICATE THE TAPE PULLER SHAFT NYLON BEARINGS IN THE TAPE STORAGE BIN.
Cross shaft assembly	8	1.04 Apply a thick film of grease to all gears and the spacing clutch reset cam plate.
Fixed gear shaft	8	1.05 Apply oil to all cams, including the camming surfaces of each clutch disc.
Gear shift arm assembly	8	
Shift gear shaft assembly	8	
Tape bracket rollers and shaft	9	
Tape winder drive bracket assembly	9	
6. CABINET	10	CAUTION: SPECIAL CARE MUST BE TAKEN TO PREVENT ANY OIL OR GREASE FROM
Cabinet hinges and slides	10	

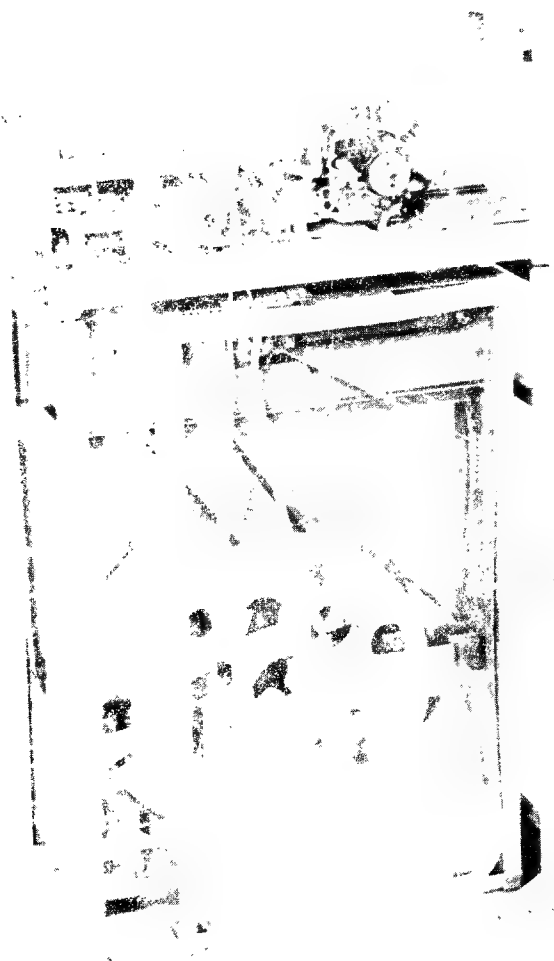
GETTING BETWEEN THE SELECTOR ARMATURE AND ITS MAGNET POLE FACES. KEEP ALL ELECTRICAL CONTACTS FREE OF OIL AND GREASE.

1.06 The photographs show the paragraph numbers referring to particular line drawings of mechanisms and where these mechanisms are located on the unit. Parts in the line drawings are shown in an upright position unless otherwise specified.

Note: References made to left, right, top, bottom, front, or rear apply to the typing unit in its normal operating position as viewed by the operator facing the unit.

1.07 The following list of symbols apply to the specific lubrication instructions given in each paragraph.

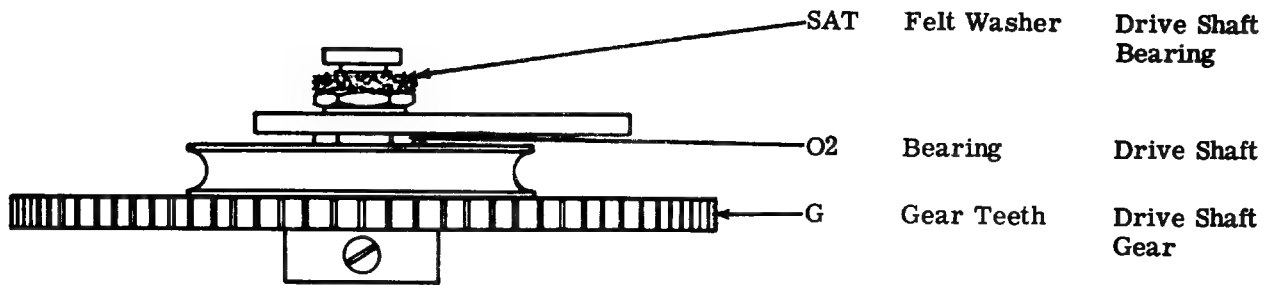
<u>Symbol</u>	<u>Meaning</u>
O1	Apply one drop of oil.
O2	Apply two drops of oil.
O3	Apply three drops of oil, etc.
G	Apply thin film of grease.
SAT	Saturate (felt oilers, washers, wicks) with oil.



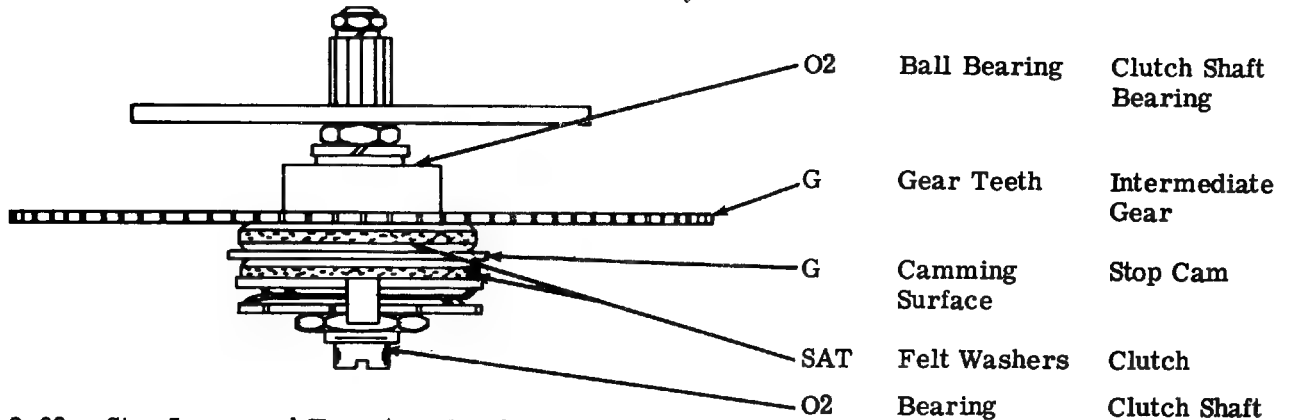
Model 28 Reperforator Transmitter Set

2. TAPE HANDLING STANDS

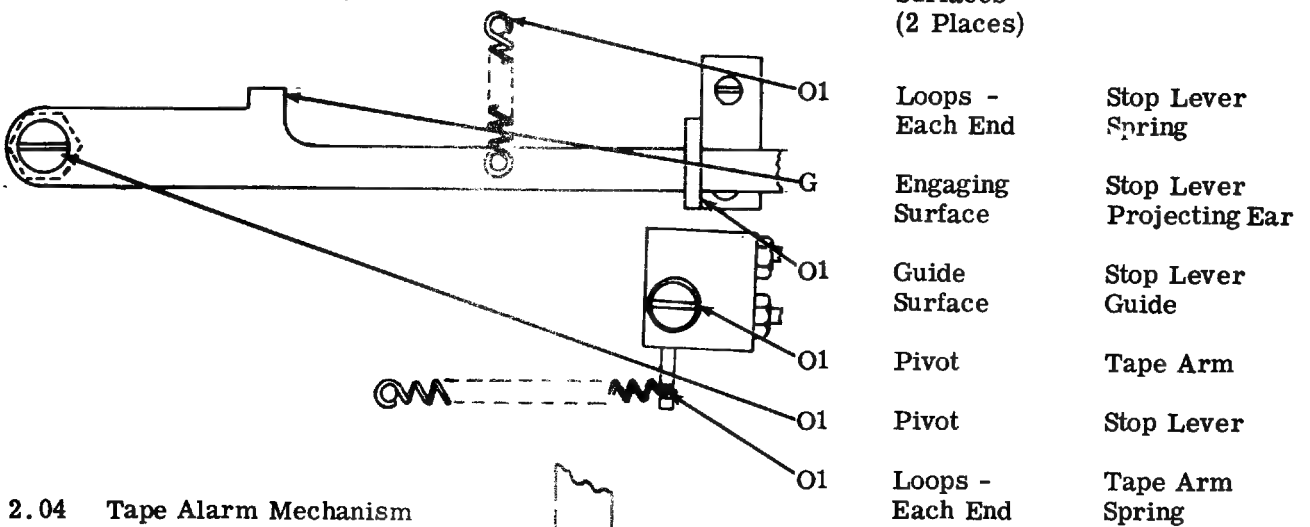
2.01 Drive Shaft Assembly



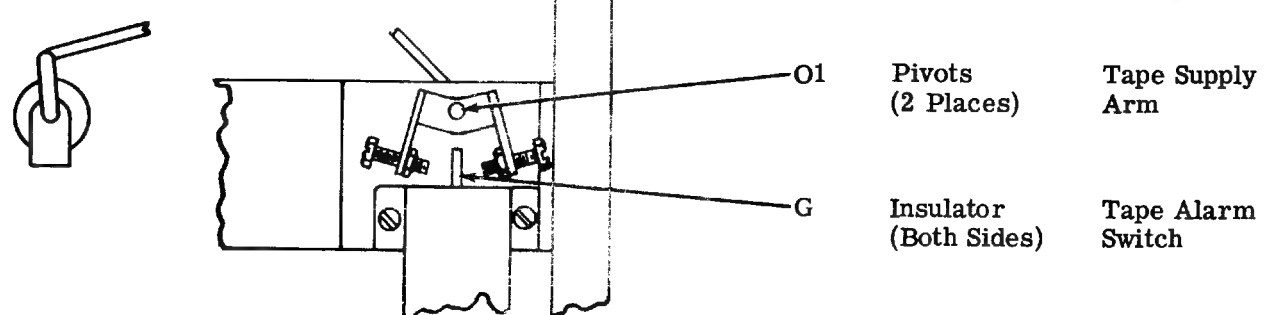
2.02 Clutch Shaft and Intermediate Gear Assembly



2.03 Stop Lever and Tape Arm Mechanism

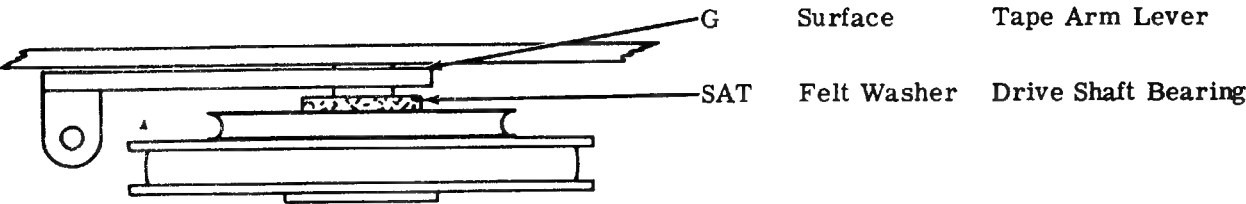


2.04 Tape Alarm Mechanism

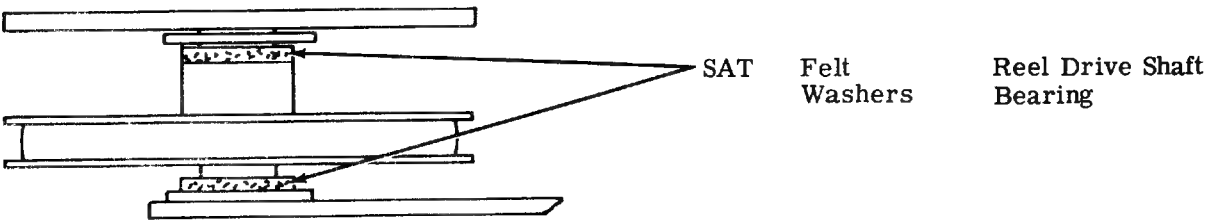


3. TAPE HANDLING STAND (HIGH SPEED ONLY)

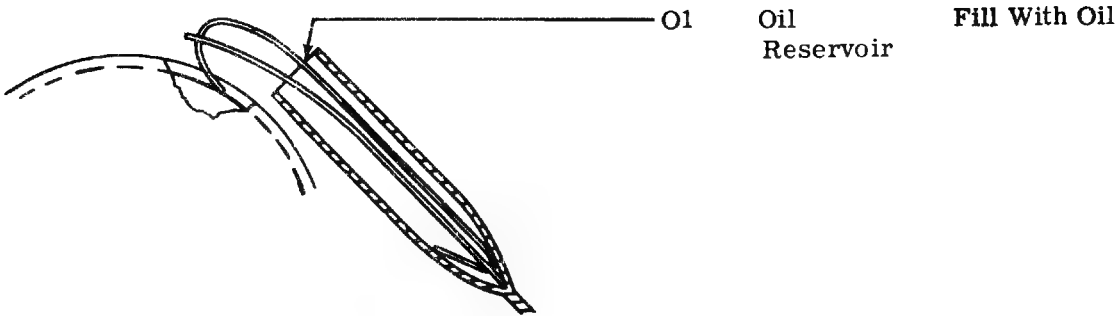
3.01 Drive Shaft Assembly



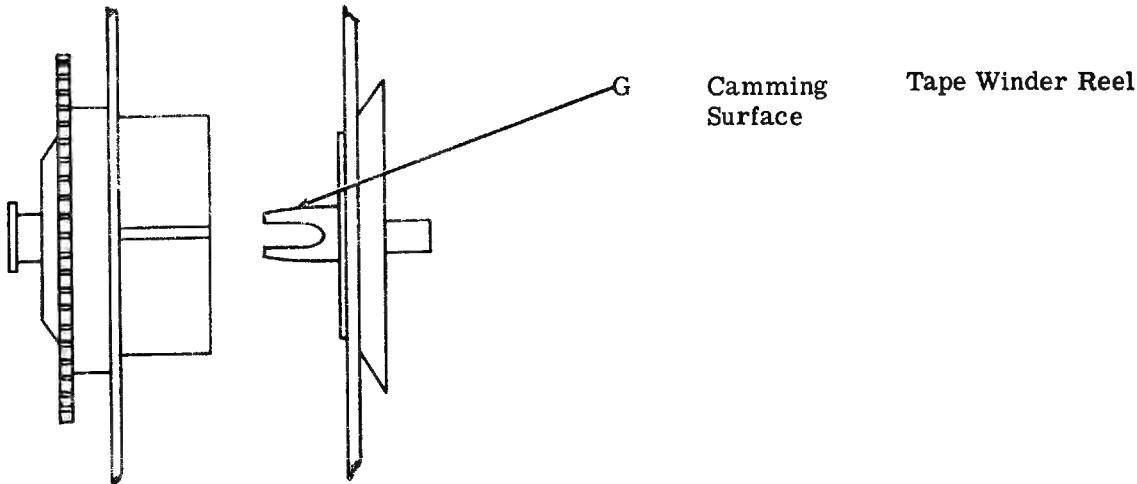
3.02 Reel Drive Shaft Assembly



3.03 Oil Reservoir



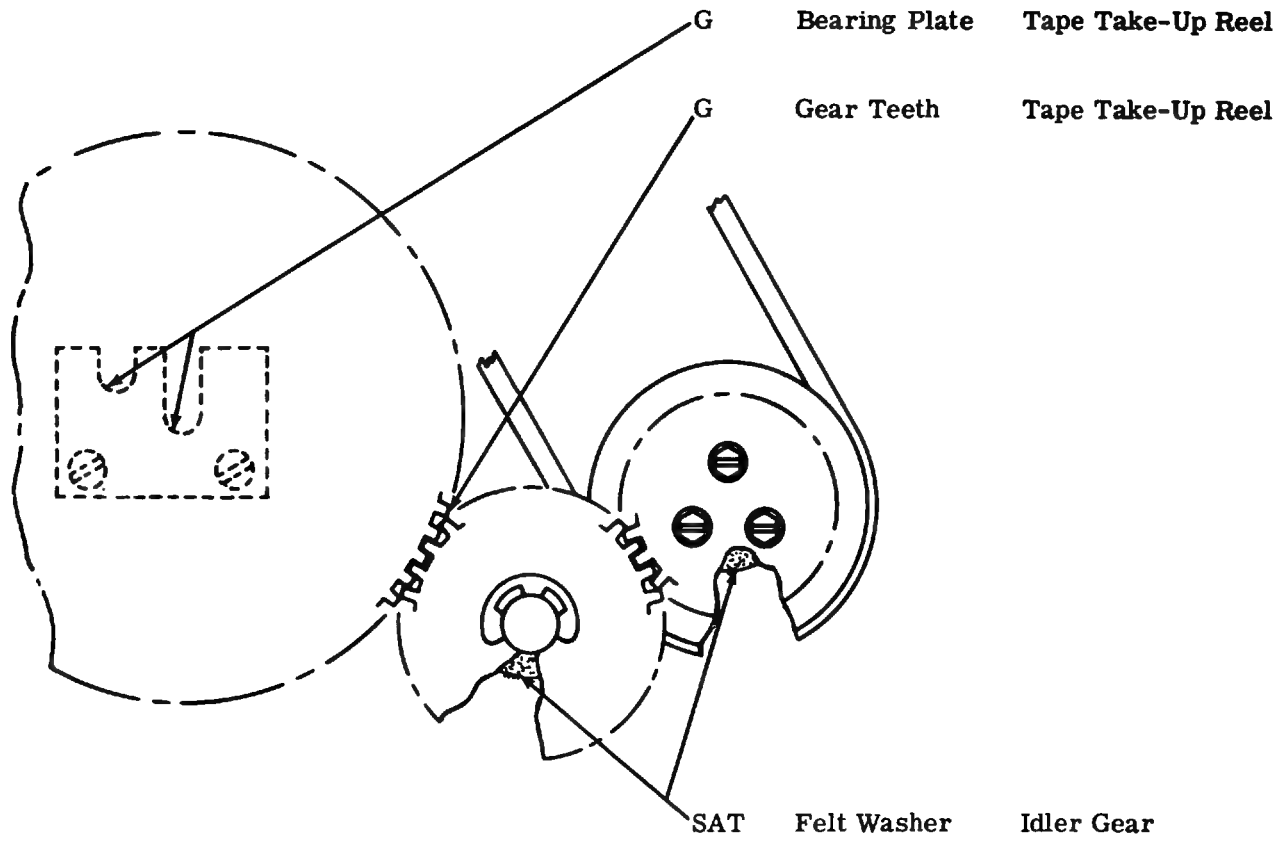
3.04 Tape Winder Reel Assembly



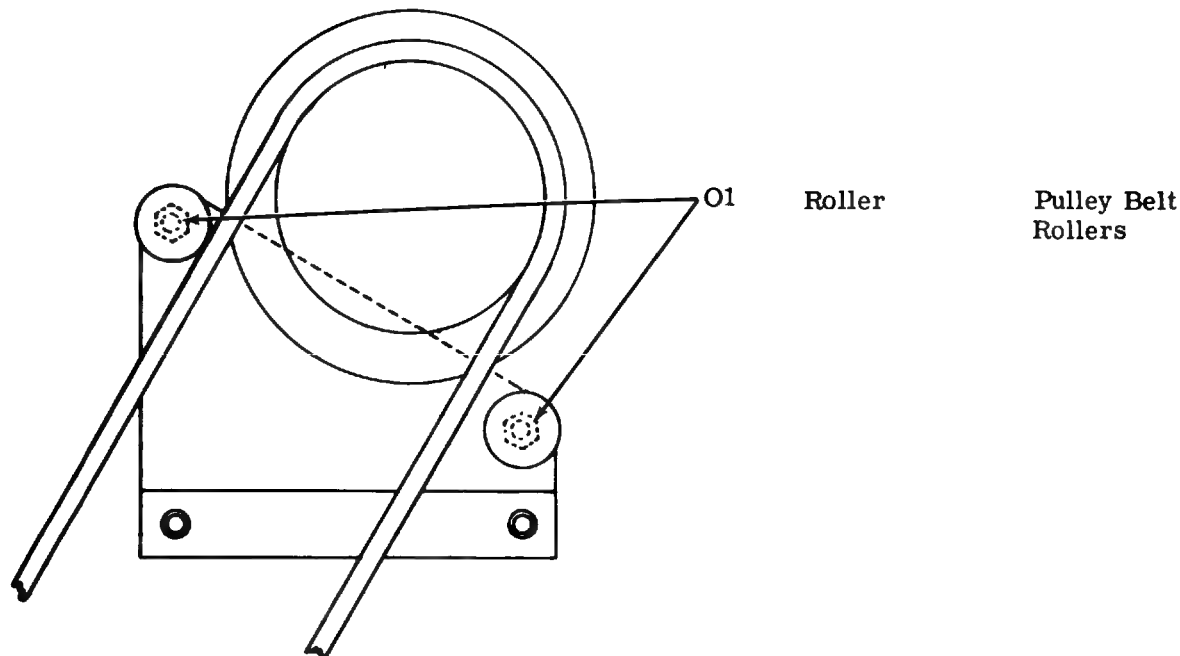
3.05 Tape Alarm Mechanism - See 2.04, Tape Alarm Mechanism

4. TAPE HANDLING STAND (V BELT DRIVE)

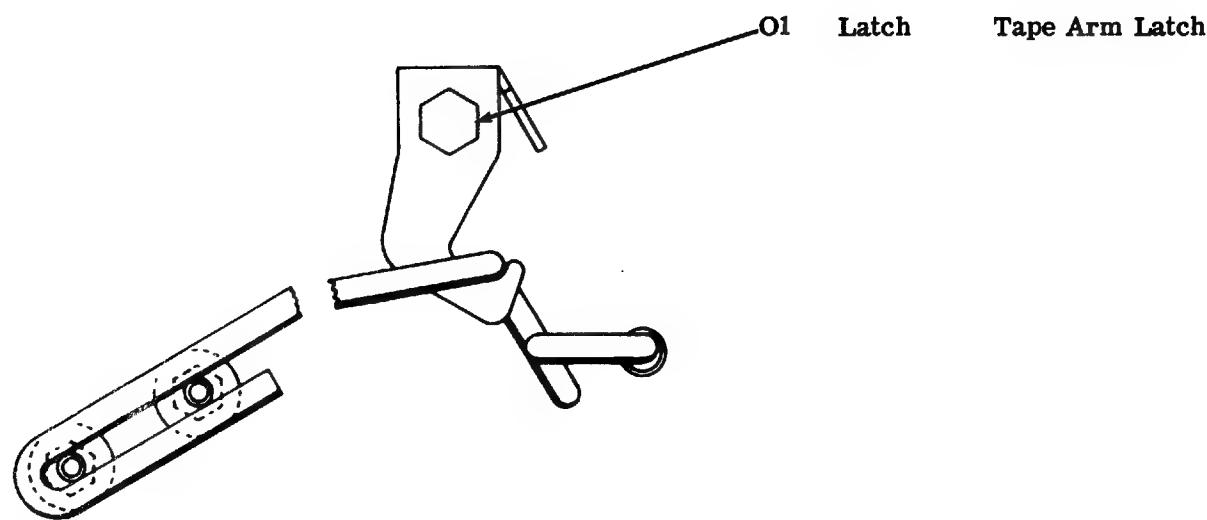
4.01 Take-Up Reel



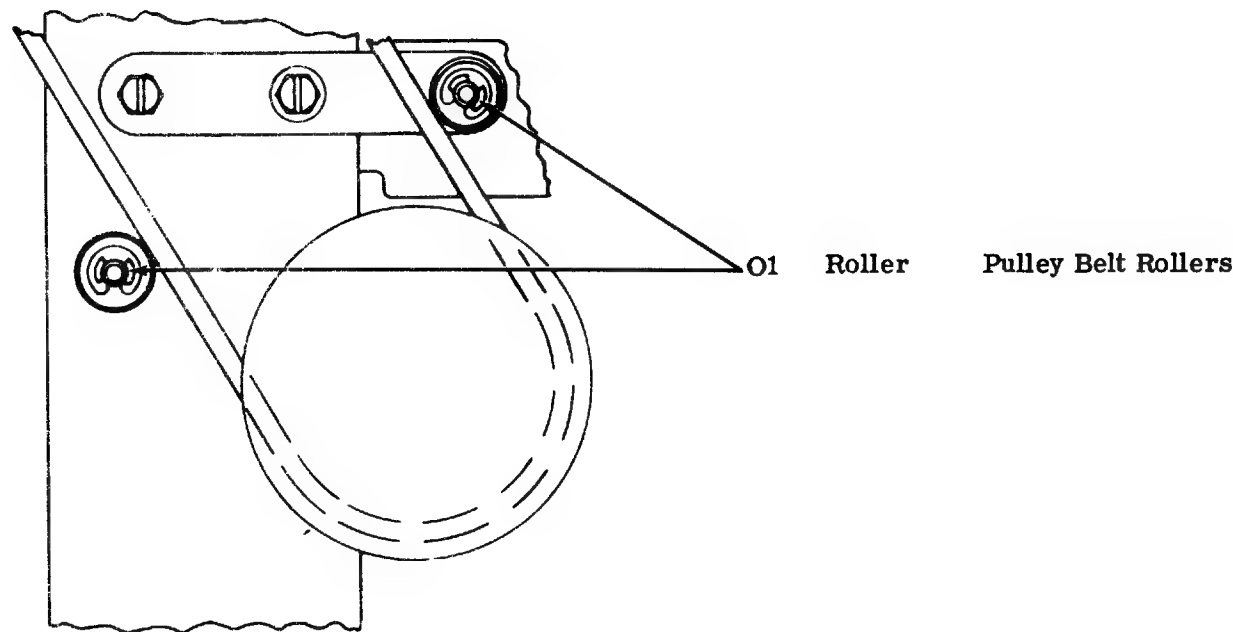
4.02 Upper Pulley Assembly



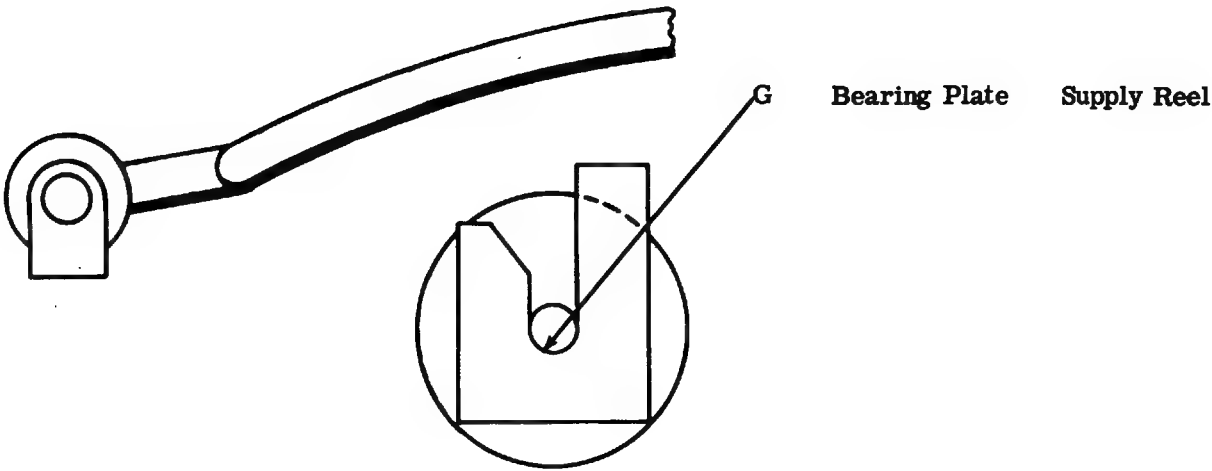
4.03 Tape Arm Latch



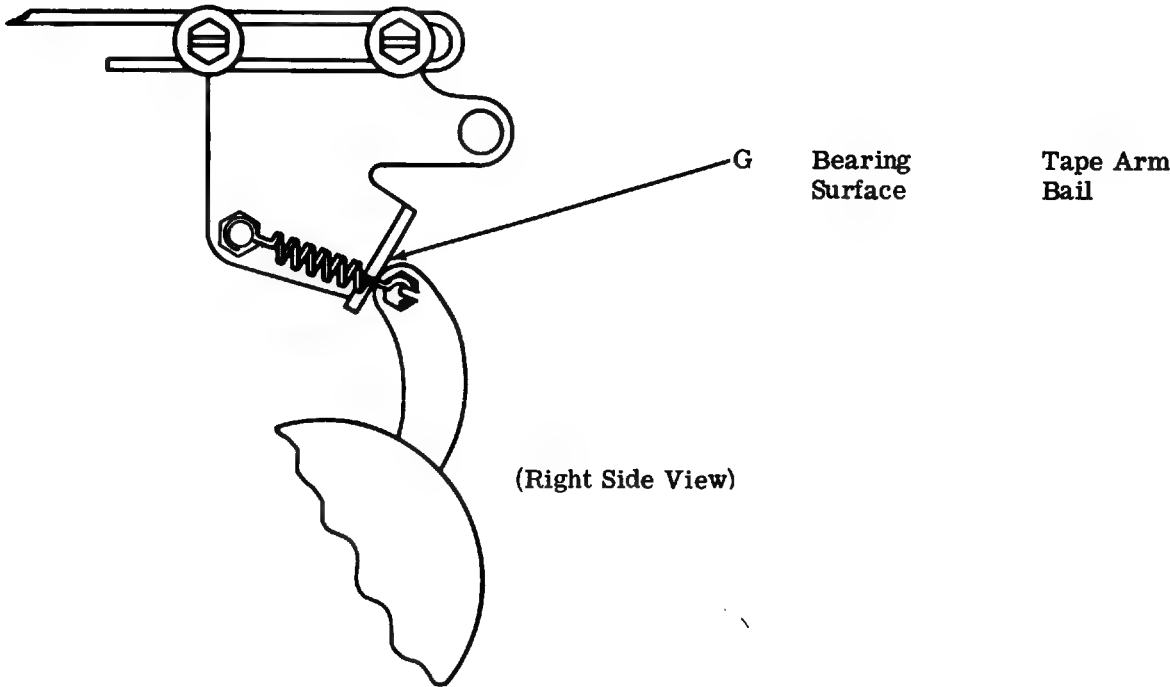
4.04 Lower Pulley Assembly



4.05 Supply Reel

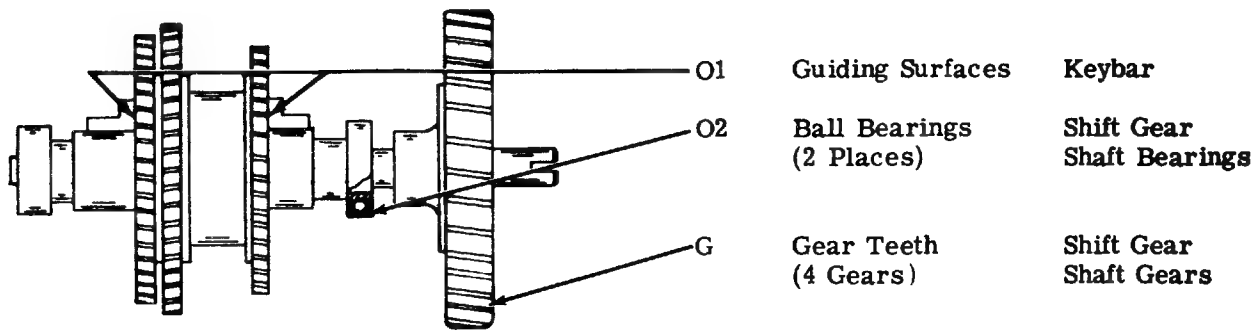


4.06 Tape Arm Bail

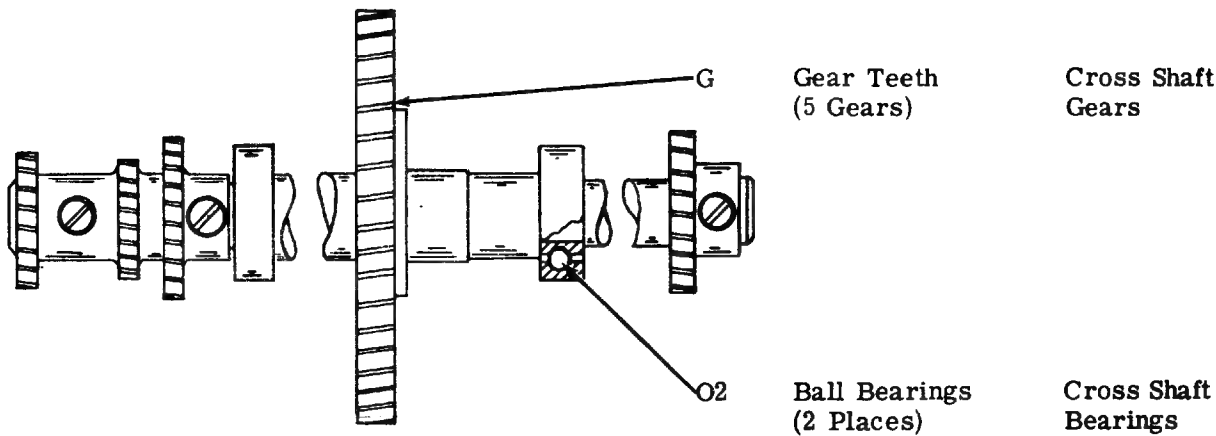


5. REPERFORATOR TRANSMITTER BASE

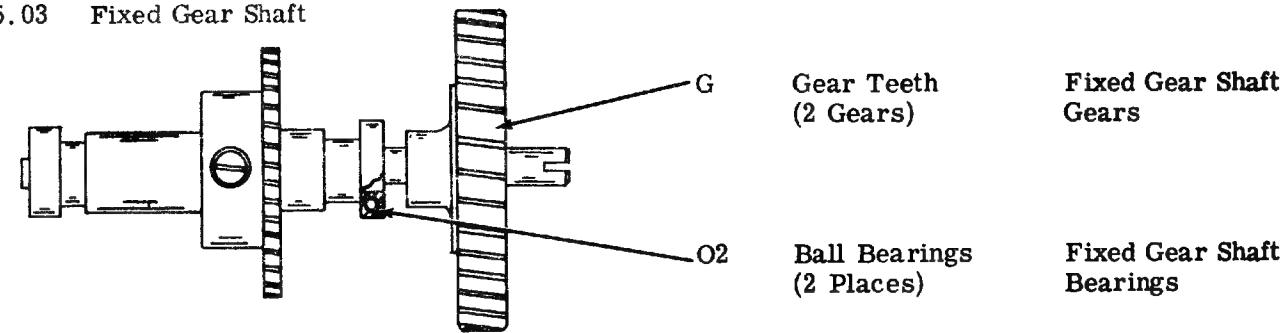
5.01 Shift Gear Shaft Assembly



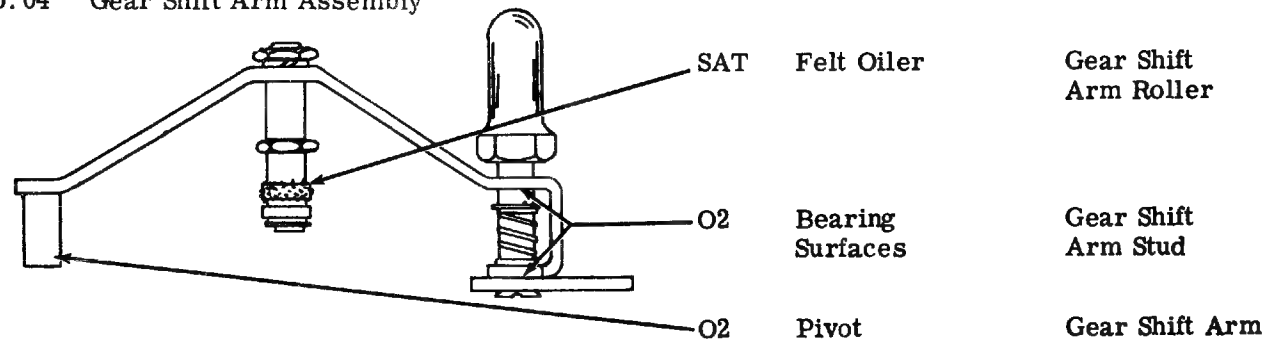
5.02 Cross Shaft Assembly



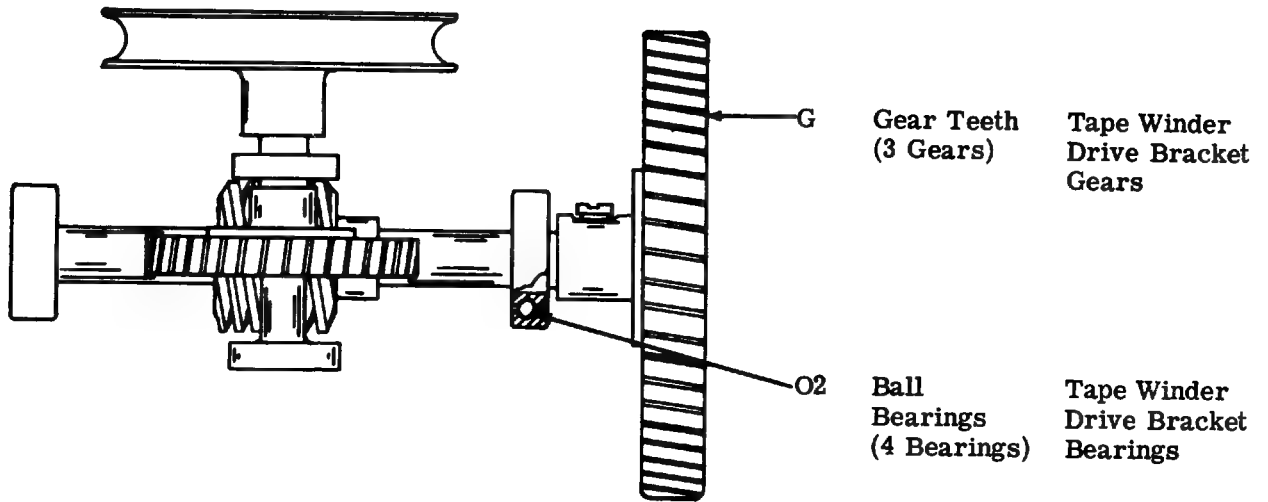
5.03 Fixed Gear Shaft



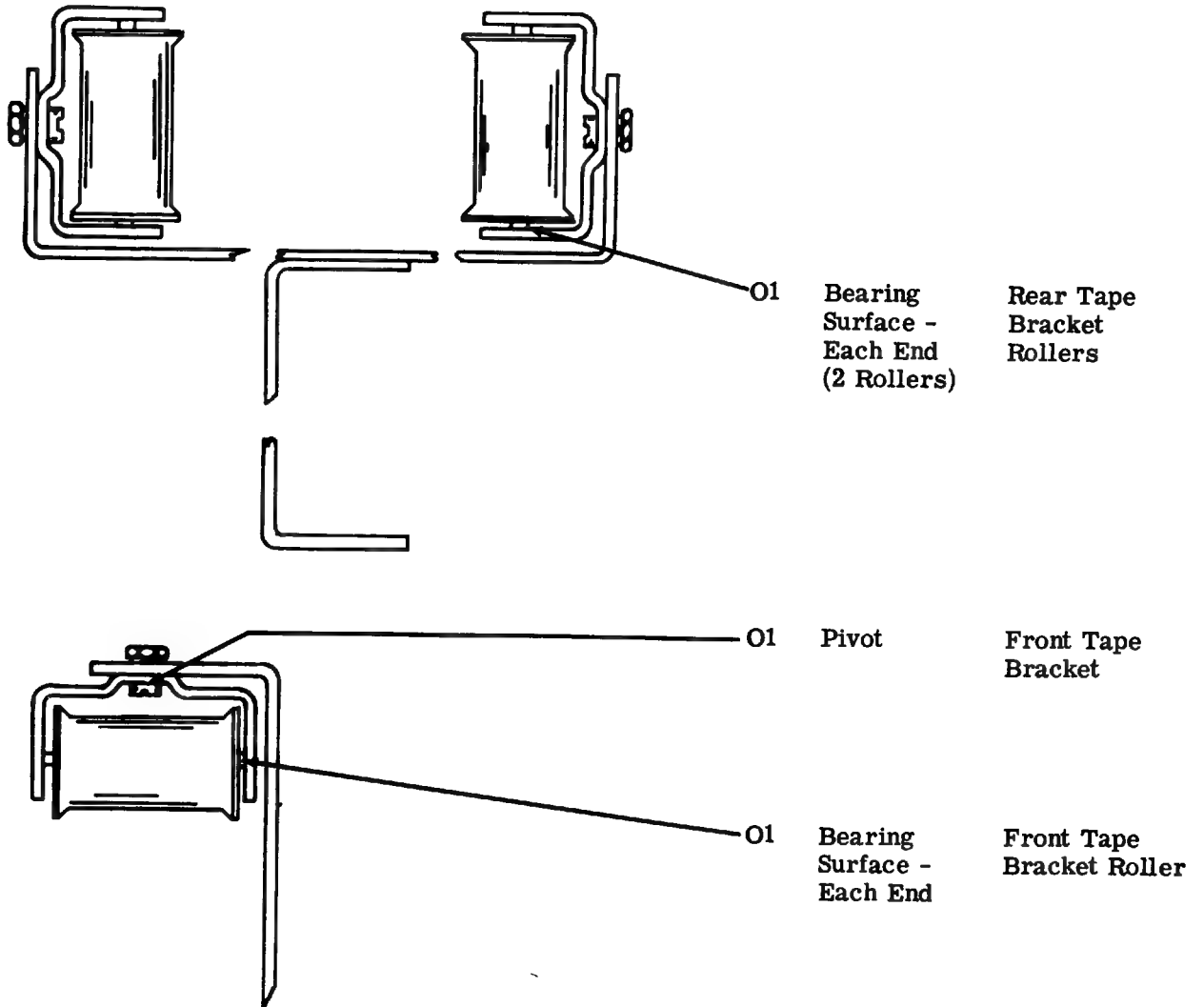
5.04 Gear Shift Arm Assembly



5.05 Tape Winder Drive Bracket Assembly



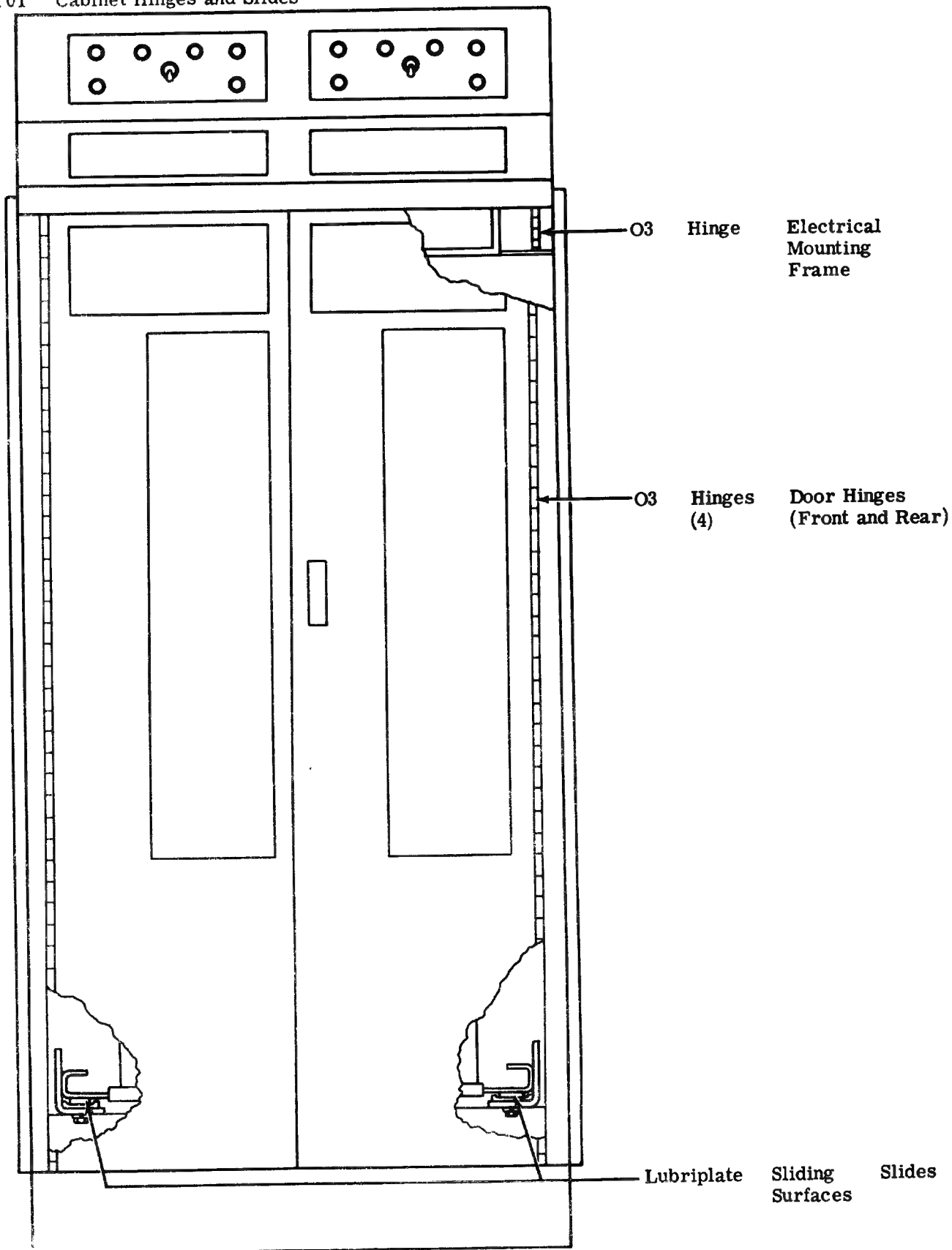
5.06 Tape Bracket Rollers and Shaft



SECTION 573-104-701TC

6. CABINET

6.01 Cabinet Hinges and Slides



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28 TAPE HANDLING STAND (LTHS) AND
REPERFORATOR TRANSMITTER BASE (LRXB)
DISASSEMBLY AND REASSEMBLY

CONTENTS	PAGE
1. GENERAL	1
2. DISASSEMBLY AND REASSEMBLY . .	2
REPERFORATOR TRANSMITTER - STANDARD SPEED SET.	2
REPERFORATOR TRANSMITTER BASE - LOW TO HIGH SPEED SET	3
REPERFORATOR TRANSMITTER BASE - HIGH TO LOW SPEED SET	3
REPERFORATOR TRANSMITTER BASE - HIGH TO LOW SPEED SET (UNITS WITH V BELT DRIVE)	4
STANDARD SPEED TAPE HANDLING STAND	4
HIGH SPEED TAPE HANDLING STAND	5

When reassembling the subassemblies, be sure to check all associated adjustments, clearances, and spring tensions.

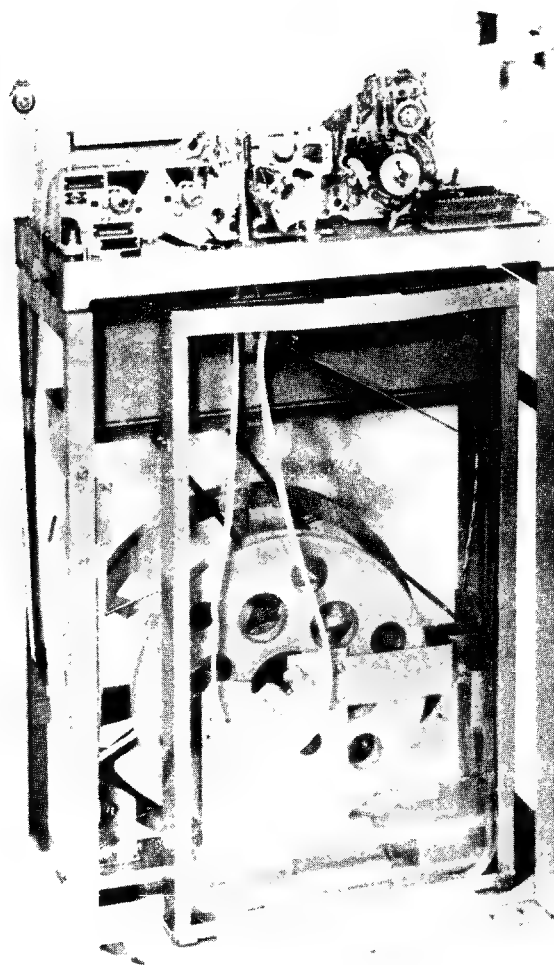
1.04 If a part that is mounted on shims is removed, the number of shims used at each of its mounting screws should be noted so that the same shim pile-up can be replaced when the part is remounted.

1. GENERAL

1.01 This section is issued to describe the disassembly and reassembly procedures for the 28 tape handling stand and reperforator transmitter base. Disassembly covers a procedure for removing the principal subassemblies which make up the unit.

1.02 Reference should be made to the exploded views found in the appropriate parts literature for an illustration of the mechanism to be disassembled, for location and visual identification of parts, and detailed disassembly and reassembly features.

1.03 Disassembly should be confined to subassemblies, which can, in some cases, be removed without disturbing adjustments.



Model 28 Reperforator Transmitter Set

SECTION 573-104-702TC

1.05 Retaining rings are made of spring steel and have a tendency to release suddenly when attempting to remove them. Loss of these retainers can be minimized as follows: Hold the retainer with the left hand to prevent it from rotating. Place the blade of a suitable screwdriver in one of the slots of the retainer. Rotate the screwdriver in a direction to increase the diameter of the retainer for removal.

1.06 Avoid loss of springs in disassembly by holding one spring loop with the left hand while gently removing the opposite loop with a spring hook. Do not stretch or distort springs when removing them.

Note: Disconnect power before starting any disassembly procedures.

1.07 When removing a subassembly from the unit, the procedure followed and the location from which parts are removed must be carefully noted so that reassembly can be done correctly. Where no specific instructions are given for reassembly, reverse the procedure used in removing it.

Note: Check the adjustments outlined in Section 573-104-700TC, whenever the reperforator or transmitter distributor has been remounted to the base.

2. DISASSEMBLY AND REASSEMBLY

REPERFORATOR TRANSMITTER - STANDARD SPEED SET

2.01 To remove reperforator unit from the base:

- (a) Remove the mounting screw that secures the tape alarm cable clamp.
- (b) Remove the hex mounting nut that secures the reperforator cable clamp adjacent to the reperforator 32-point connector.
- (c) Remove the mounting screws that secure the 32-point connector.
- (d) Remove the mounting screw that secures the TP156183 or TP156184 anchor bracket to the base. Remove the three mounting screws that secure the reperforator frame to the base. Lift the reperforator from the base.
- (e) To replace the reperforator unit on its base:

(1) Place the reperforator unit on its base so that its three mounting holes line up with those in the base. Loosen the screw that secures the TP156183 or TP156184 anchor bracket to the punch assembly frame. Thread the previously removed mounting screw through the anchor bracket and into the tapped hole in the base, but do not tighten the screw. Start the remaining three mounting screws through the reperforator frame mounting holes into the tapped holes in base, but do not tighten the screws. Press the anchor bracket against the base and tighten the screw that secures the bracket to the punch assembly frame. Tighten the screw that secures the bracket to the base. Tighten the three screws that secure the reperforator frame to the base.

(2) Replace the 32-point connector and cable clamps removed during disassembly.

2.02 To remove transmitter distributor from the base:

- (a) Disconnect the line shunt cable connectors.
- (b) Remove the two screws that secure the two transmitter distributor cable clamps.
- (c) Remove the mounting screws that secure the 32-point connector.
- (d) Remove the transmitter gear guard from the base.
- (e) Remove the three mounting screws that secure the transmitter to the base. Lift the transmitter from the base.
- (f) To replace the transmitter distributor, reverse the disassembly procedure. See 1.07 note before replacing cable clamps and 32-point connector.

Note: If it is necessary to readjust the vertical alignment of pivoted sensing head and punch, do not replace the cable clamps and 32-point connector for the transmitter distributor until the adjustment is completed.

2.03 To remove the reperforator transmitter base from the tape handling stand:

- (a) Remove the tape winder drive belt from the tape winder drive pulley.

- (b) Disconnect all plugs from their connectors on the tape handling stand frame.
 - (c) Loosen the three captive screws securing the base to the stand, and lift the base from the stand.
- 2.04 To remove tape winder drive bracket assembly:
- (a) Remove the four mounting screws, lockwashers, and flat washers that secure the TP158748 tape winder drive bracket to the base.
 - (b) Remove the bracket and note the number of TP158750 shims between the bracket and the base.
- 2.05 To remove the cross shaft assembly:
- (a) Remove the screw and lockwasher that secure the TP158745 bearing clamp.
 - (b) Remove the cross shaft bearing retaining screws, washers, and nuts.
 - (c) Remove the cross shaft driven gear hub mounting screw and lockwasher.
 - (d) Slide cross shaft assembly sideways out of bearing seats and remove shaft assembly from base.
- 2.06 To remove gear bracket assembly (fixed speed or shift gears):
- (a) Remove the transmitter and reperforator gear covers.
 - (b) Remove the three gear bracket mounting screws and washers, and remove the gear bracket assembly.
- REPERFORATOR TRANSMITTER BASE - LOW TO HIGH SPEED SET**
- 2.07 To remove reperforator unit from the base:
- (a) Remove the 36-point connector.
 - (b) Remove the two mounting screws and washers that secure the gear cover, and remove the gear cover.
 - (c) Remove the three mounting screws and washers securing the reperforator.
 - (d) Lift the reperforator from the base.
 - (e) To replace the reperforator unit, reverse the disassembly procedure.
- 2.08 To remove high speed tape reader from the base:
- (a) Remove the three mounting screws and washers that secure the gear guard, and remove the gear guard.
 - (b) Remove the three mounting screws and lockwashers that secure the casting to its mounting plate.
 - (c) Remove the reader from the base.
 - (d) To replace the high speed tape reader, reverse the disassembly procedure.
- 2.09 To remove the reperforator transmitter base from the tape handling stand:
- (a) Remove the four screws and washers securing the alarm plug to the tape handling stand connector plate.
 - (b) Remove the four screws, spacers, and washers that secure the connector plate to the tape handling stand.
 - (c) Remove the tape winder drive belt from the tape winder drive pulley.
 - (d) Remove the tape bin motor plug and loosen the three captive base mounting screws. Lift the base from the stand.
- 2.10 To remove tape winder drive bracket assembly: See 2.04 in this section.
- 2.11 To remove cross shaft assembly: See 2.05 in this section.
- 2.12 To remove gear bracket assembly: See 2.06 in this section.
- REPERFORATOR TRANSMITTER BASE - HIGH TO LOW SPEED SET**
- 2.13 To remove high speed reperforator unit from the base:
- (a) Remove the 36-point male plug.
 - (b) Remove the two screws and washers that secure the 36-point female plug to its mounting bracket.

- (c) Loosen the setscrews securing the rubber coupling between the sprocket drive shaft and the high speed reperforator drive shaft.
- (d) Remove the five mounting screws and washers securing the reperforator to its mounting bracket and remove the reperforator.
- (e) To replace the reperforator unit, reverse the disassembly procedure.

2.14 To remove transmitter distributor from the base:

- (a) Loosen the screw that secures the mounting bracket at the reader end of the transmitter distributor, and swing the bracket clear of the casting.
- (b) Remove the three screws and washers that secure the gear housing.
- (c) Remove the two mounting screws and washers at the distributor end of the unit, and lift the transmitter distributor from the base.

2.15 See 2.09, 2.10, 2.11, and 2.12 in this section for remaining disassembly procedure.

REPERFORATOR TRANSMITTER BASE - HIGH TO LOW SPEED SET (UNITS WITH V BELT DRIVE)

2.16 To remove high speed reperforator unit from the base:

- (a) Remove the 25-point male plug.
- (b) Remove the two screws and washers that secure the 25-point female plug to its mounting bracket.
- (c) Remove the four mounting screws and washers securing the reperforator to its mounting bracket, and remove the reperforator.
- (d) To replace the reperforator unit, reverse the disassembly procedure.

2.17 To remove transmitter distributor from the base:

- (a) Loosen the screw that secures the mounting bracket at the reader end of the transmitter distributor, and swing the bracket clear of the casting.
- (b) Remove the three screws and washers that secure the gear housing.
- (c) Remove the two mounting screws and washers at the distributor end of the unit, and lift the transmitter distributor from the base.

2.18 See 2.09, 2.10, 2.11, and 2.12 of this section for remaining disassembly procedure.

STANDARD SPEED TAPE HANDLING STAND

2.19 Remove the tape supply and take-up reels and the intermediate tape storage bin.

2.20 To remove tape winder assembly:

- (a) Remove the two screws and lockwashers that secure the TP158995 capacitor bracket to the tape winder base plate.
- (b) Remove the two screws, lockwashers, and flat washers that secure the TP159214 support bracket to the TP158972 bracket.
- (c) Remove the four screws, lockwashers, and flat washers that secure the tape winder assembly to stand frame.
- (d) Unhook the tape supply arm.
- (e) Remove the tape winder assembly from the stand.

2.21 To remove clutch shaft assembly:

- (a) Remove the intermediate gear hub mounting screw and lockwashers, and remove the intermediate gear and hub.
- (b) Remove the drive belt.
- (c) Unhook the stop lever spring.
- (d) Remove the two screws, lockwashers, and flat washers that secure the TP158983 intermediate gear bracket to the TP158972 bracket and remove the intermediate gear bracket with stop lever attached.
- (e) Remove the two screws, lockwashers, and flat washers that secure the TP158986 outer clutch bearing bracket to the TP126902 outer plate, and remove the bracket.

- (f) Remove the two screws, lockwashers, and flat washers that secure the TP160191 inner bearing plate to the TP126902 outer plate and remove the clutch shaft assembly.

HIGH SPEED TAPE HANDLING STAND

- 2.22 Remove the tape supply and take-up reels and the intermediate tape storage bin.

2.23 To remove tape winder assembly:

- (a) Remove the four screws and washers that secure the two TP170828 crossbars to the tape handling stand frame.
- (b) Remove the two screws and washers that secure the TP170827 "U" bracket to the TP170826 bracket at the rear of the winder assembly.
- (c) Remove the tape winder assembly.

